What Determines the Profitability of a Retail Gasoline Outlet?

A Study for the Competition Bureau of Canada

LECG Canada

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Table of Contents

Executive Summary 7

Introduction 9

1. Objectives and Limitations 11

2. Definitions 12

2.1 Efficiencies 12

2.2 EBITDA 12

2.3 Ancillary Services 12

2.4 Independents 12

3. Literature Review 13

4. The Data 15

5. Economic Analysis 20

5.1 Differences between Outlets A and B (independent retailers) 20

5.2 Differences between Outlets C and D (vertically-integrated firms) 21

5.3 Implications 22

5.4 Time Series Analysis 23

5.5 Econometric Analysis 28

6. Profitability Analysis 33

6.1 Caveats 33

6.1.1 Information Used 33

6.1.2 Caution on Incomplete Information & Impact of Cost of Petroleum Purchases on Margins 33

6.1.3 Organization of Operations 34

6.2 Sample Outlets 34

6.2.1 Outlet A (independent retailer) 34

6.2.2 Outlet B (independent retailer) 34

6.2.3 Outlet C (vertically-integrated firm) 34

6.2.4 Outlet E (vertically-integrated firm) 34

6.3 Analysis 34

6.3.1 Organization of Profitability Analysis 34

6.3.2 Profitability Calculated from Outlet Specific Revenues and Costs 36

6.3.3 Profitability by Omitting Coupons and Discounts 39
6.3.4 Profitability by Omitting Coupons and Discounts and Labour Expenses 40
6.3.5 Petroleum Sales Volume and Grade Mix 42
6.3.6 Petroleum Sales Revenue and Revenue Grade Mix 43
6.3.7 Revenues by Sales Type 44
6.3.8 Gross Margin by Sales Type 46
6.3.9 Summary of Costs Attributable to Petroleum Revenue 48

7. Conclusions 50

8. References 53

9. Appendices 54

Appendix A. Information Request Sent to Participating Retailers 54

Appendix B. Curriculum Vitae of Authors 57

List of Figures

Figure 1 – Average Monthly Retail Prices for Regular Gasoline 24
Figure 2 – Average Monthly Retail Prices for Mid-grade Gasoline 24
Figure 3 – Average Monthly Retail Prices for Premium Gasoline 25
Figure 4 – Average Monthly Wholesale Prices for Regular Gasoline 25
Figure 5 – Average Monthly Wholesale Prices for Mid-grade Gasoline 26
Figure 6 – Average Monthly Wholesale Prices for Premium Gasoline 26
Figure 7– Average Monthly Profit Margin for Regular Gasoline 27
Figure 8 – Average Monthly Profit Margin for Mid-Grade Gasoline 27
Figure 9 – Average Monthly Profit Margin for Premium Gasoline 28
Figure 10 – Total Profit per Litre 37
Figure 11 – Profit per Litre by Sales Type in Dollars 38
Figure 12 – Total Profit per Litre Before Promotion/Discount Expense 39
Figure 13 – Profit per Litre by Sales Type in Dollars Before Promotion/Discount Expense 40
Figure 14 – Total Profit per Litre Before Promotion/Discount & Labour Expenses 41
Figure 15 – Profit per Litre by Sales Type in Dollars Before Promotion/Discount & Labour Expenses 41
Figure 16 – Petroleum Sales Volume Grade Mix Percentage 43
Figure 17 – Petroleum Revenues Grade Mix Percentage 44
Figure 18 – Revenues by Sales Type Percentage 45
Figure 19 – Revenue per Litre by Sales Type in Dollars 46
Figure 20 – Gross Margin Percentage by Sales Type, Before Labour Costs 48
Figure 21 – Costs Attributable to Petroleum Revenues per Litre 49

List of Tables

Table 1 - Retail Prices and Volume of Sales 15
Table 2 -Wholesale Prices 16
Table 3 - Average Monthly Retail and Wholesale Prices (Cents/Litre) - Outlet A (March 2003 – December 2004) 16
Table 4 - Average Monthly Retail and Wholesale Prices (Cents/Litre) - Outlet B (January 2002 – December 2004) 17
Table 5 - Average Monthly Retail and Wholesale Prices (Cents/Litre) - Outlet B (March 2003 – December 2004) 17
Table 6 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Outlet C (January 2002 – December 2004) 17
Table 7 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Outlet C (March 2003 – December 2004) 18
Table 8 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Outlet D (January 2002 – December 2004) 18
Table 9 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Outlet D (March 2003 – December 2004) 18
Table 10 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Toronto Averages (January 2002 – December 2004) 19
Table 11 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Toronto Averages (March 2003 – December 2004) 19
Table 12 - Regular Grade Gasoline 30
Table 13 - Mid Grade Gasoline 30
Table 14 - Premium Grade Gasoline 31
Table 15 - Regular Wholesale Gasoline 31
Table 16 - Mid-Grade Wholesale Gasoline 32
Table 17 - Premium Wholesale Gasoline 32

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This study has been conducted by Anindya Sen, Associate Professor of Economics at the University of Waterloo, and Robert Boulton, Principal, LECG Canada. Professor Sen is an empirical economist with expertise in Canadian competition policy and has published several peer-reviewed papers on the impact of competition in retail gasoline and financial services. Robert Boulton is a Chartered Accountant and Chartered Business Valuator and has worked or practiced exclusively in the areas of business valuation, damages quantification and corporate finance since 1986. His experience includes venture capital investing with one of the pre-eminent venture capital firms in Canada and being the CFO of a public multi-national computer component manufacturer. He has also consulted on matters concerning shareholder disputes, minority oppression actions, intellectual property infringement and professional negligence and has extensive experience with Competition Act matters relating to mergers and acquisitions.

LECG wishes to acknowledge the efforts of Anthony Clemente and Julius Koo, Senior Consultants, which have been seminal. Of course, any mistakes or errors remain the responsibility of Professor Sen and LECG Canada.

Executive Summary

In conjunction with LECG Canada, Professor Anindya Sen has been asked to conduct an independent study aimed at understanding the significant determinants of outlet profitability in the retail gasoline industry using data collected by the Competition Bureau.

There have been frequent allegations of anti-competitive behavior on the part of vertically-integrated gasoline firms including: predatory pricing; collusion; retail price-fixing; and the "squeezing" of smaller independents through higher wholesale prices in an effort to force their exit from the industry.

Evaluating the validity of such complaints is hampered by a lack of understanding of the factors behind the profitability of a typical gasoline retail outlet. This is largely due to the difficulties of procuring appropriate data; obtaining the relevant information from individual outlets is quite difficult. This could also be the reason behind the paucity of related academic research.

This study seeks to bridge these gaps by employing pricing and other financial data from 2002 to 2004 obtained from representative retail outlets owned by vertically-integrated firms as well as independent retailers in the Greater Toronto Area and adjoining areas. The variation in location and firm structure allows us to evaluate (in a qualified manner) the impact of local competition as well as the presence of "squeezing" by vertically-integrated firms. Also, this research is truly unique in terms of methodology as it consists of a blend of economic as well as accounting techniques.

Simple graph and qualitative analysis suggests that movements in both retail and wholesale prices are largely dictated by corresponding fluctuations in crude oil prices; however, local competition does seem to impact retail pricing. Importantly, they lend little support to the existence of predatory pricing.

These results are further substantiated by the econometric results, which suggest that an increase in wholesale and crude oil prices results in a similar increase in retail and wholesale prices, irrespective of whether an outlet is owned by an independent or a vertically integrated refiner. Specifically, a 1 cent/litre increase in wholesale prices results in a 0.87 and 0.81-0.89 cent/litre increase in retail prices for regular grade gasoline charged by independents and vertically integrated firms, respectively. On the other hand, a 1 cent/litre increase in crude oil prices results in a 0.73 and 0.71-0.91 cent/litre increase in (regular grade) wholesale prices experienced by independents and refiners, respectively.

Our analyses reveals that while differences in retail prices are not extremely large, wholesale prices are almost identical across stations, offering evidence contrary to the existence of squeezing or predatory behavior by vertically-integrated firms. On the other hand, there are considerable differences in sales volumes. These facts suggest that controlling for size, the profitability of an outlet is principally dependent on throughput.

In terms of division across specific grades, the independents obtain roughly 80% of their total revenue from the sale of regular grade gasoline. On the other hand, the vertically-integrated firms earn roughly 70% of their revenue from regular grade sales demonstrating a greater relative reliance on premium grades.

From a policy perspective, key findings stem from the profitability analyses, which offer clearer insight on the true income of retail outlets. Specifically, while net revenue figures based on the difference between retail and wholesale prices suggest profits for all outlets, the profitability analysis demonstrates that very few outlets consistently earn profits once station specific costs are factored in. For example, net revenue figures imply that independents obtained a per litre profit of between 2.57-3.14 cents from the sale of regular grade gasoline while vertically-integrated firms earned from 2.5-3.5 cents/litre. In comparison, the profitability analyses indicate that independents consistently made losses on an annual basis. Even integrated refiners sometimes incurred losses. This is insightful given the common belief that high gasoline prices inevitably results in enhanced profits.

These results point to the pitfalls of exclusively relying on the difference between retail and wholesale prices in evaluating outlet and ultimately, industry profitability. The other important insight is that while ancillary revenues from convenience store sales and car wash facilities may be small relative to total gasoline revenues, once they have been adjusted for relevant costs, they contribute substantially to overall profitability. However, one must be very cautious in drawing strong inferences from the profitability analysis due to the lack of data on outlet operator revenues and expenses.

While profitability analysis is typically not conducted by the Competition Bureau, the findings of this study point to the benefits and importance of such research in determining the state of competition within or across industries.

Introduction

While there has been an abundance of research aimed at attempting to explain movements in Canadian gasoline prices, there is limited empirical literature on the determinants of individual outlet profitability. This is unfortunate, as a better understanding of this issue has some rather profound implications for public policy.

An examination of recent trends suggests that the Competition Bureau is frequently asked to investigate allegations of predatory behavior on the part of vertically-integrated gasoline firms. A common complaint is that vertically-integrated firms often drop retail prices to levels that are unsustainable for smaller independents, resulting in their exit from the market. Vertically-integrated firms have an incentive to engage in such behavior, as fewer competitors will enable them to recoup present financial losses through higher future prices. Further, vertically-integrated firms are able to sustain predatory or low prices as they earn a significant amount of profits from ancillary product offerings.

Another example of predatory behavior is when vertically-integrated firms increase input or wholesale prices charged to smaller independents in an effort to drive up their costs and eventually force their departure from the market. Again, this implies obvious benefits for vertically-integrated firms in terms of enhanced market share and revenue, but possible harm to consumers from higher retail prices. Economists have labeled such increases in wholesale prices as "raising the rivals' costs".

However, it is important to understand that the exit of smaller firms might even result in lower retail prices. This would specifically occur if the smaller independents happen to be inefficient with higher marginal costs relative to larger vertically-integrated firms.

Hence, in the absence of certain information, it is very difficult to evaluate the existence and/or extent of predatory behavior. As a consequence any public policy measures might have confounded impacts that adversely impact societal welfare. In this specific context, answers to the following questions would be of obvious value;

1. Typically, how closely do prices charged by both vertically-integrated firms and smaller independents follow each other?

2. What are the important determinants of outlet profitability?

3. Do vertically-integrated refiners charge wholesale prices to their affiliates differently from wholesale prices charged by refiners to independents?

4. How can one distinguish an efficient station from an inefficient one?

5. What is typical profitability enjoyed by vertically-integrated and independent retailers?

6. How much revenue do vertically-integrated firms enjoy from the sale of ancillary services and products?

This study attempts to answer these questions using outlet specific data provided by both independent as well vertically-integrated firms. In order to preserve confidentiality, the outlets owned by the independent retailers are labeled as "A" and "B" while different vertically-integrated firms own "C", "D", and "E". Each of these firms has provided month specific data on a variety of financial indices from one specific outlet each located in the Greater Toronto Area or the adjoining municipalities of Oshawa, Pickering, Burlington, Hamilton, Cambridge, and Kitchener-Waterloo.

Providing answers to the above questions has obvious implications from the perspective of Canadian public policy. A better understanding of the business details faced by an "average" gasoline retail outlet in one of Canada's most competitive markets will assist the Bureau in forming benchmarks to evaluate the validity of complaints related to retail gasoline, in an efficient and effective manner. From an academic viewpoint, access to such detailed information is rare and could possibly assist in addressing some interesting questions in the field of industrial organization.

However, it is important to acknowledge that a significant number of the above questions cannot be addressed through economic or econometric techniques. Profitability analysis is critically required to understand the efficiency of each station. In this respect, this report is truly a unique contribution to the literature as it consists of detailed analyses performed by economists as well as accountants.

The remainder of the report is structured as follows. The next section clearly delineates the objectives and limitations of this report. Section 3 contains a cursory summary of relevant literature. Section 4 consists of a description of the data while Section 5 discusses the economic and econometric research. Relevant profitability analysis is contained in Section 6. Section 7 concludes with a summary of the principal findings.

1. Objectives and Limitations

Using station specific data from five retail outlets, this study attempts to understand the determinants of outlet profitability by;

1. Evaluating and comparing trends in retail prices charged across different grades of gasoline by these stations and comparing them to corresponding movements in city specific retail prices.

2. Evaluating and comparing trends in overall profitability of these stations on a "stand alone basis" as well as by category (vertically-integrated versus independents).

3. Decomposing and comparing trends in station profitability into gas and non-gas revenue.

4. Econometrically estimating the impact of fluctuations in wholesale prices on retail prices and comparing differences across stations.

5. Comparing wholesale prices experienced by these different stations to city specific averages.

6. Empirically evaluating the impact of local competition on retail prices.

7. Understanding the impact of cost structure on profitability.

Of course, the following caveats must be noted.

8. The data, though unique and containing more information on an individual station level than other comparable databases, consists of details on only five stations. Hence, caution must be exerted in extending the conclusions of this study to other settings.

9. One must also be cautious in extrapolating the conclusions of this study to independent retailers. Our sample of independents consists of two retailers (outlets A and B) with operations that are not focused on gasoline sales and with no direct refining capabilities.

10. With respect to outlets owned by vertically-integrated firms (C, D, and E), this study does not attempt to evaluate the division between upstream and wholesale profits. This is beyond the scope of this study.

11. Due to missing information, data on stations A, B, C, and D are used for the economic analysis while corresponding data on stations A, B, C, and E are employed for the profitability analysis.

2. Definitions

For the purpose of this study we specifically employ the following definitions, which are in most cases, consistent with the Conference Board of Canada (2001);

2.1 *Efficiencies*

Are assumed to accrue from initiatives that impact *per unit* avoidable costs. Avoidable costs are costs that can be foregone by ceasing operation of the outlet. Avoidable costs, of course, include those costs that vary with sales levels or are independent of the sales level.

2.2 *EBITDA*

This is a profitability measure defined in terms of earnings before interest, taxes, depreciation and amortization (EBITDA).

2.3 *Ancillary Services*

Ancillary services include car wash service, convenience store sales, automotive services, and full service restaurant sales.

2.4 *Independents*

A firm with no refining capacity is assumed to be an independent.

3. Literature Review

There has been a significant amount of research on Canadian retail and wholesale gasoline prices over the past decade. One of the motivating factors is the popular perception that retail gasoline prices are "unreasonably high", especially during the summer time, resulting in frequent public hearings and investigations by the Competition Bureau. The underlying belief is that vertically-integrated firms collude in order to set and maintain high gasoline prices. This review discusses the main findings of some recent and relevant econometric studies.

The Conference Board of Canada (1999) conducted a comprehensive study on determinants of both average monthly retail and wholesale prices across 11 Canadian cities from 1993 to 1999. Using a simple empirical specification, the study finds a positive and significant correlation between retail and wholesale prices. Further, a one-cent increase in wholesale prices is associated with a one-cent increase in retail prices within a one-month period. On the other hand, variation in wholesale prices is primarily influenced by movements in U.S. wholesale prices. The key conclusion is that both retail and wholesale markets are competitive with variation in retail prices and wholesale prices being ultimately determined by international crude oil prices rather than the degree of local competition.

Sen (2001) finds comparable results using a similar dataset but with a slightly different empirical specification. Specifically, he employs an econometric model where the effects of market concentration and wholesale prices (along with other factors) are estimated on retail prices. Similar to the Conference Board (2001) he finds that a greater amount of the variation in retail prices is explained by wholesale prices rather than local market concentration. Local market competition also plays a much smaller role in determining movements in wholesale prices relative to the impacts of crude oil price shocks. Hence, his conclusions are remarkably similar to the Conference Board (1999) findings; specifically that, although competition does play a role in determining retail and wholesale prices, the relative impacts are much smaller in magnitude than the effects of crude oil prices. Given these findings, the allegation of price fixing and collusion by vertically-integrated firms is difficult to sustain.

Another strand of literature focuses on the role of smaller independents on retail competition. Employing pooled cross-city time series data on wholesale prices and market firm shares from 1991 to 1998, Sen (2005) finds that an increase in the market share of independents has no statistically significant direct impact on retail prices. On the other hand, Eckert (2003) finds that the presence of independents can be correlated with retail price cycles.

Finally, Sen (2005) evaluates the impact of vertical integration on wholesale prices in an effort to evaluate the existence of "raising the rivals' costs"; in other words, the incentive of vertically-integrated firms to increase input or wholesale prices to smaller independents in order to eventually force their exit and thus enhance revenues and market shares from the retail markets. However, his results indicate a negative and statistically

significant correlation between the aggregate retail market share of vertically-integrated firms and wholesale prices, suggesting that vertical integration is more likely to be associated with efficiencies rather than strategic behavior. The important point is that as in most other previous studies, there seems to be little evidence of anti-competitive behavior on the part of larger firms.

The above review raises several interesting observations. First, while most studies focus on average prices within and across cities, very few have actually managed to use station specific data. As pointed out by Eckert and West (2004) station specific data are definitely more desirable in trying to understand firm behavior and allows for richer analysis. Indeed, most of the questions raised in section 2 can only be answered through station specific data. Second, there has been little research in trying to understand the determinants of station specific pricing as well as profitability obviously because of a lack of relevant financial data. This study attempts to bridge this gap using outlet specific data from five stations in the Greater Toronto Area and adjoining areas as well as a combination of economic and profitability analyses.

4. The Data

This section outlines the data employed in the econometric analysis. Data on retail and wholesale prices and sales volume of regular, mid-grade, and premium gasoline were obtained from one station each belonging to five companies. Of these, outlets C and D represent the vertically-integrated firms with refining capabilities, while independent retailers own outlets A and B with no refining capacity.[1] With respect to retail prices and volume, outlets B, C, and D provided data for a relatively long time period (January 2002 – December 2004), while corresponding data from outlet A was over a shorter duration of time (January 2005 – May 2005). However, wholesale prices were provided over similar time periods (January 2002- December 2004 for outlets B, C, and D; August 2002 – April 2005 for outlet A). The following tables summarize key characteristics of these data.

Table 1 - Retail Prices and Volume of Sales

Company	Grades	Method of Calculation	Time	Units
Outlet A	Regular, Mid-Grade, and Premium	Raw daily prices for Regular Grade otherwise average monthly	Jan. 2, 2005 - May 21, 2005	Cents per Litre
Outlet B	Regular, Mid-Grade, and Premium	Average Daily	Jan.1, 2002 – Dec. 31, 2004	Cents per Litre
Outlet C	Regular, Mid-Grade, and Premium	Average Daily	Jan. 1, 2002 – Dec. 31, 2004	$ per Litre
Outlet D	Regular, Mid-Grade, and Premium	Monthly revenues per litre sold	Jan. 2002 – Dec. 2004	$ per Litre

[1] Outlet E is also owned by a vertically-integrated firm; however, we are only able to use its data in the profitability analysis due to some missing information.

Table 2 -Wholesale Prices

Company	Grades	Method of Calculation	Time	Units
Outlet A	Regular, Mid-Grade, and Premium	Average Monthly	Aug. 2002 – Apr. 2005	$ per Litre
Outlet B	Regular, Mid-Grade, and Premium	Average Monthly	Jan. 2002 – Dec. 2004	$ per Litre
Outlet C	Regular, Mid-Grade, and Premium	Average Monthly	Jan. 2002 – Dec. 2004	$ per Litre
Outlet D	Regular, Mid-Grade, and Premium	Average Monthly	Jan. 2002 – Dec. 2004	$ per Litre

In most cases average daily retail prices for all types of gasoline are available. The one exception is outlet A, which only provided average monthly data on prices for premium and mid-grade gasoline. In contrast, retail sales volumes and wholesale prices are exclusively in monthly totals. While the average monthly wholesale price experienced by outlets B and A (independent retailers) are obviously based on purchases from vertically-integrated refiners, outlets C and D's (vertically-integrated firms) average wholesale price is based on an internal transfer price. Specifically, it is obtained by taking the total value of sales by the firm to its affiliated retailer and dividing it by the number of litres to obtain a price per litre. Sample statistics on retail and wholesale prices per litre, excluding taxes, are contained in the tables below.

Table 3 - Average Monthly Retail and Wholesale Prices (Cents/Litre) - Outlet A (March 2003 – December 2004)

	Retail Price of Gasoline			Wholesale Price of Gasoline		
Sample Statistics	Regular	Mid-Grade	Premium	Regular	Mid-Grade	Premium
Mean	41.69	45.03	48.23	39.12	40.98	42.84
Sample Variance	27.12	27.03	27.88	32.56	34.67	36.91
Minimum	33.98	37.31	40.36	30.73	32.48	34.23
Maximum	51.05	54.21	57.73	51.10	53.35	55.60
Count	22	22	22	22	22	22

Table 4 - Average Monthly Retail and Wholesale Prices (Cents/Litre) - Outlet B (January 2002 – December 2004)

	Retail Price of Gasoline			Wholesale Price of Gasoline		
Sample Statistics	Regular	Mid-Grade	Premium	Regular	Mid-Grade	Premium
Mean	40.75	45.73	50.14	36.51	38.57	39.86
Sample Variance	26.28	28.90	26.46	37.67	39.48	41.30
Minimum	28.49	33.17	37.81	24.27	26.22	27.42
Maximum	53.42	59.07	62.79	49.89	52.39	54.09
Count	36	36	36	36	36	36

Table 5 - Average Monthly Retail and Wholesale Prices (Cents/Litre) - Outlet B (March 2003 – December 2004)

	Retail Price of Gasoline			Wholesale Price of Gasoline		
Sample Statistics	Regular	Mid-Grade	Premium	Regular	Mid-Grade	Premium
Mean	42.16	47.34	51.57	39.02	41.14	42.48
Sample Variance	21.75	24.55	21.83	32.06	34.18	36.47
Minimum	34.46	39.19	43.85	30.95	32.95	34.15
Maximum	53.42	59.07	62.79	49.89	52.39	54.09
Count	22	22	22	22	22	22

Table 6 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Outlet C (January 2002 – December 2004)

	Retail Price of Gasoline			Wholesale Price of Gasoline		
Sample Statistics	Regular	Mid-Grade	Premium	Regular	Mid-Grade	Premium
Mean	42.04	47.75	51.83	36.75	38.79	40.30
Sample Variance	26.83	29.86	29.08	36.47	37.29	38.31
Minimum	29.66	34.44	39.18	24.59	26.61	28.04
Maximum	55.89	61.73	65.65	50.97	52.99	54.57
Count	36	36	36	36	36	36

Table 7 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Outlet C (March 2003 – December 2004)

	Retail Price of Gasoline			Wholesale Price of Gasoline		
Sample Statistics	Regular	Mid-Grade	Premium	Regular	Mid-Grade	Premium
Mean	43.54	49.48	53.49	39.04	41.11	42.64
Sample Variance	22.46	22.87	24.81	32.35	33.35	34.77
Minimum	34.81	40.64	44.17	30.52	32.68	34.17
Maximum	55.89	61.73	65.65	50.97	52.99	54.57
Count	22	22	22	22	22	22

Table 8 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Outlet D (January 2002 – December 2004)

	Retail Price of Gasoline			Wholesale Price of Gasoline		
Sample Statistics	Regular	Mid-Grade	Premium	Regular	Mid-Grade	Premium
Mean	40.74	46.18	50.16	36.58	38.12	39.65
Sample Variance	31.92	34.52	33.91	40.36	42.29	44.83
Minimum	28.24	32.77	37.53	24.10	25.69	27.27
Maximum	54.70	60.27	64.48	50.12	52.74	55.41
Count	32	32	32	32	32	32

Table 9 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Outlet D (March 2003 – December 2004)

	Retail Price of Gasoline			Wholesale Price of Gasoline		
Sample Statistics	Regular	Mid-Grade	Premium	Regular	Mid-Grade	Premium
Mean	42.20	47.83	51.65	38.71	40.27	41.80
Sample Variance	27.06	27.01	29.65	31.65	34.91	39.01
Minimum	34.37	40.11	43.87	30.56	32.15	33.62
Maximum	54.70	60.27	64.48	50.12	52.74	55.41
Count	22	22	22	22	22	22

Table 10 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Toronto Averages (January 2002 – December 2004)

	Retail Price of Gasoline		Wholesale Price of Gasoline	
Sample Statistics	Regular	Premium	Regular	Premium
Mean	43.05	52.67	38.60	42.22
Sample Variance	36.52	37.90	38.25	41.23
Minimum	28.92	38.38	26.23	29.73
Maximum	54.90	64.59	53.27	57.55
Count	36	36	36	36

Table 11 - Average Monthly Retail and Wholesale Prices (Cents/Litre) – Toronto Averages (March 2003 – December 2004)

	Retail Price of Gasoline		Wholesale Price of Gasoline	
Sample Statistics	Regular	Premium	Regular	Premium
Mean	45.20	54.93	41.00	44.69
Sample Variance	28.18	28.98	33.45	37.52
Minimum	36.45	45.99	32.48	35.76
Maximum	54.90	64.59	53.27	57.55
Count	22	22	22	22

5. Economic Analysis

5.1 *Differences between Outlets A and B (independent retailers)*

Tables 3 and 4 consist of the sample statistics of retail and wholesale gasoline prices for outlets A and B (independent retailers) in cents per litre excluding taxes, respectively, over available data. However, for comparison purposes we shall restrict the outlet B data to the same time period (March 2003 – December 2004) as the outlet A data. The summary statistics for outlet B over this time period are contained in Table 5.

The mean sample retail prices (Tables 3 and 5) between outlets A and B are quite similar with respect to regular grade gasoline, being only half a cent apart. The gaps between other grades of gasoline are a bit larger; specifically, outlet B charges approximately two and three cents more, on average, for mid-grade and premium, respectively. The minimum and maximum values for all grades of gasoline are correspondingly higher for outlet B data over the sample period.

However, sample mean wholesale prices across all grades of gasoline are interestingly enough, quite similar between the two stations with minimum as well as maximum values also being close. It is also important to note that sample mean retail and wholesale prices are lower than city averages (Table 11) provided by M.J. Ervin.

The key difference between the two stations seems to be in terms of the mean volume of sales. In order to preserve confidentiality, we cannot report the mean summary statistics. However, we note that using the same time period (March 2003 – December 2004) as with respect to retail and wholesale prices, retail sales volumes at outlet A exceeds twice the amount of corresponding sales at outlet B with respect to all grades of gasoline. This is comforting, as coupled with the lower prices charged by outlet A relative to outlet B, these facts clearly imply a downward sloping demand curve. Of course, there are several caveats associated with this observation, given that they are not even in the same area. But it is nonetheless, reassuring.

The lower price charged by outlet A could also be a function of the fact that it faces five stations within a one kilometer radius as opposed to the four outlets B competes with in a similar radius. Of course, one must be careful in placing undue emphasis on this, as the implication is that an additional station has a considerable marginal impact in terms of prices.

What does this all mean in terms of revenues and profits? While specific numbers cannot be reported, we note that mean monthly revenues from regular grade gasoline are much higher for outlet A than outlet B. These revenues are roughly 80% of all gasoline sales. Outlet A also earns higher profits from regular grade gasoline sales than outlet B. These profit figures are basically derived from a per litre profit margin (retail price – wholesale price) of 2.57 cents for outlet A and 3.14 cents for outlet B from March 2003 to December 2004. It is interesting to note that the comparable spreads with respect to mid-grade and premium gasoline are much higher for both stations. Specifically, the per litre

profit margin experienced by outlet A for mid-grade gasoline is roughly 4 cents and 5 cents for premium gasoline. The corresponding statistics for outlet B are 6 and 9 cents, respectively.[2] These figures correlate with corresponding Toronto city averages found in Table 11.

5.2 *Differences between Outlets C and D (vertically-integrated firms)*

It is now important to contrast the above results with corresponding figures from the outlets C and D between the March 2003 and December 2004 period. Unsurprisingly, relevant means from Tables 6 and 7 demonstrate that outlet C prices are roughly two cents higher across all grades of gasoline on a per litre basis, relative to prices charged by outlets B and A. These results hold even over the January 2002 – December 2004 time period. One possibility for this is product differentiation; consumers might have a preference for gasoline sold by vertically-integrated firms possibly because of a belief that the gas is cleaner or more reliable than gas sold by independents.[3] Another possibility is vertically-integrated firms can product differentiate themselves on the basis of a greater variety of product offerings, relative to smaller independents. A final reason may be the fact that outlet C only faces one other competitor within a one-kilometer circle.

On the other hand, corresponding prices charged by outlet D are lower than C's. And what is compelling about this result is that it faces more competitors, all of whom happen to be vertically-integrated firms.

However, what is even more intriguing is the fact that outlet C's wholesale price is remarkably similar to outlet B's (independent retailer), irrespective of whether we study the Jan 2002 – Dec 2004 or March 2003 – Dec 2004 time period. As a consequence, it is unsurprising to note that outlet C earns significantly more in profits on a per litre basis than outlets B and A (the independent retailers). For example, during the March 2003 – December 2004 sample period, outlet C earned roughly 4.5, 8.5, and 11 cents per litre on regular, mid-grade, and premium gasoline. While outlet D experiences lower wholesale prices, its profit margins are very similar (Tables 8 and 9). As noted above, the corresponding figures for outlet B were 3,6, and 9 cents per litre, while outlet A numbers were 2.5, 4, and 5 cents per litre.

Not only does outlet C enjoy a higher profit margin on a per litre basis but it also has a higher throughput for all grades of gasoline than outlet B and outlet A. Corresponding volumes sold by outlet D are lower than outlet C and higher than outlet B. While outlet D's regular grade sales are lower than outlet A, it has higher sales in other grades. As a result it is intuitive that outlet C earns much higher average monthly profits than outlets B, D, and A. Another interesting difference is that both outlets C and D (the vertically-

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[2] These figures are from Tables 3 and 5.

[3] This is of course, despite the fact that the gasoline sold by the independent firms is obtained from vertically-integrated firms.

integrated firms) earn a lower (higher) percentage of their profits from regular (premium) grade gasoline than the other stations.

5.3 *Implications*

In summary, our analysis suggests the following;

1. There is a difference in mean retail prices charged by the stations. Outlet C's price is the highest, followed by outlets B, D, and A.

2. The difference in retail prices between stations increases with the grade of gasoline. For example, although outlet B prices for regular grade gasoline are higher than outlet A, the gap in prices for premium grade gasoline between the two stations is even higher. A similar differential exists between prices charged by outlet B, outlet D, and outlet C. These differences should be expected to the extent that the demand for higher grades of gasoline are more price inelastic than the demand for regular grade gasoline.

3. These prices seem to be accurately measured, as they are similar to city average prices collected by M.J. Ervin.

4. The degree of local competition seems to be a factor as there is a correlation between the number of stations within a one-kilometer radius and retail prices charged by each station. For example, outlet C consistently charges the highest prices and faces just one competitor within a one-kilometer radius. On the other hand, outlet D charged lower retail prices and competes with more stations. However, one must be very cautious in placing a strong emphasis on this observation; the higher retail prices charged by outlet C could very well be the result of other unobserved confounded factors that are impossible to control for with such a limited dataset.

5. On the other hand, average wholesale prices experienced by the different stations are strikingly similar across all grades of gasoline. This observation offers counter evidence to allegations that independent retailers are forced to purchase gasoline at wholesale prices that are significantly different than those enjoyed by affiliates of vertically-integrated firms. However, it is also important to acknowledge that generalizing this result for all independents may not be entirely accurate, given the likely stronger bargaining power of outlet A and outlet B in this regard, relative to other smaller independents.

6. Outlet C enjoys higher average margins for all grades of gasoline followed by outlet D. However, retail margins for regular grade gasoline are not that dissimilar between vertically integrated refiners and independents. Specifically, net revenue figures suggest that the independents obtained a per litre profit of between 2.57-3.14 cents from the sale of regular grade gasoline while vertically-integrated firms earned from 2.5-3.5 cents/litre over a similar sample period.

7. The similarity in wholesale prices and small discrepancy in retail prices suggests that gasoline firms are essentially price-takers – wholesale prices closely track corresponding movements in crude oil prices, while differences in retail prices are probably dictated to a limited extent by factors such as local competition.

8. Differences in average revenue and profits are then largely dictated by throughput, implying that choosing an appropriate location is of paramount significance. Apart from the number of other local competitors, the amount of average throughput will obviously be a function of population density and the amount of local traffic.

9. In this respect, it is important to note that outlet C has the highest volume of sales for all grades of gasoline.

10. Outlets A and B (the independent retailers) obtain a significant portion of their gas revenue and profits from regular grade sales. While sales from regular grade gasoline does constitute a majority of the revenues and profits earned by outlets C and D, a nontrivial portion also comes from the sale of higher grades of gasoline, relative to corresponding returns obtained by outlets A and B.

5.4 *Time Series Analysis*

The above conclusions are predicated on comparisons of sample means of retail and wholesale prices over time and across stations. However, relying on sample means might lead to erroneous conclusions if trends in prices are extremely volatile with large deviations around the sample mean. In order to test this possibility we present charts of time-series trends in each of the above variables. Figures 1, 2, and 3 present time-series variation with respect to regular, mid-grade, and premium retail prices, respectively. Similarly, Figures 4, 5, and 6 contain time-series trends for regular, mid-grade, and premium wholesale prices, respectively. Figures 7, 8, 9 contain corresponding trends for retail margins with respect to regular, mid-grade, and premium retail prices, respectively.

Over most of the sample period, the time-series trends in regular retail prices (Figure 1) closely follow the order given by the sample means; in other words, outlet C prices are the highest, followed by outlet B, outlet D, and then outlet A. But it is interesting to note that this order is less pronounced toward the end of the sample. On the other hand, the order is definitely quite clearly visible throughout the time period for the mid-grade (Figure 2) and premium grades (Figure 3).

In contrast, time-series trends in wholesale prices across all grades of gasoline (Figures 4, 5, and 6) clearly demonstrate the similarity in prices experienced by all stations. Corresponding movements in margins across different grades (Figures 7-9) present no surprises. On an average basis, margins enjoyed by outlet C are the highest, but there are instances where their margins are exceeded by corresponding margins from outlet B and

outlet A, especially towards the end of the sample period. However, outlet C margins are consistently higher with respect to superior grades of gasoline.

Figure 1 – Average Monthly Retail Prices for Regular Gasoline

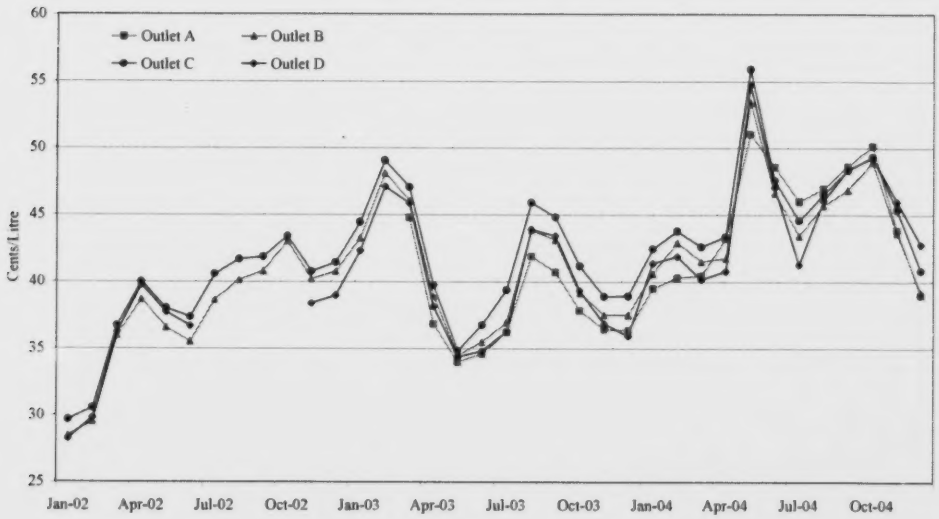


Figure 2 – Average Monthly Retail Prices for Mid-grade Gasoline

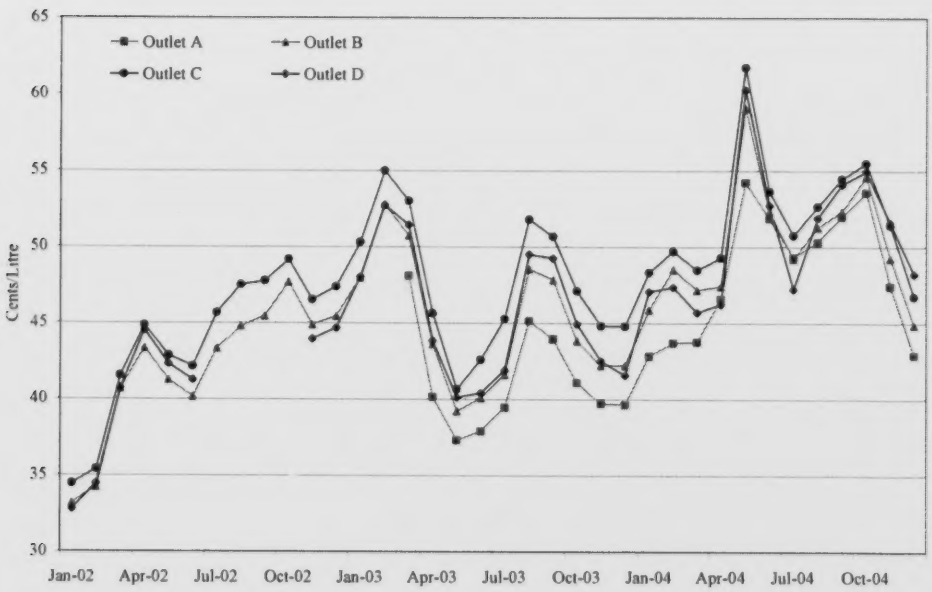


Figure 3 – Average Monthly Retail Prices for Premium Gasoline

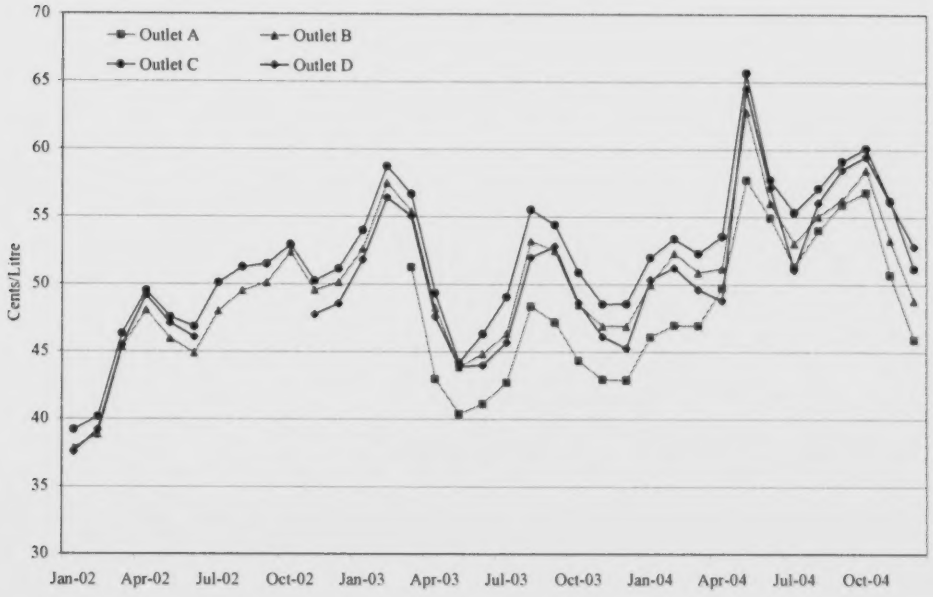


Figure 4 – Average Monthly Wholesale Prices for Regular Gasoline

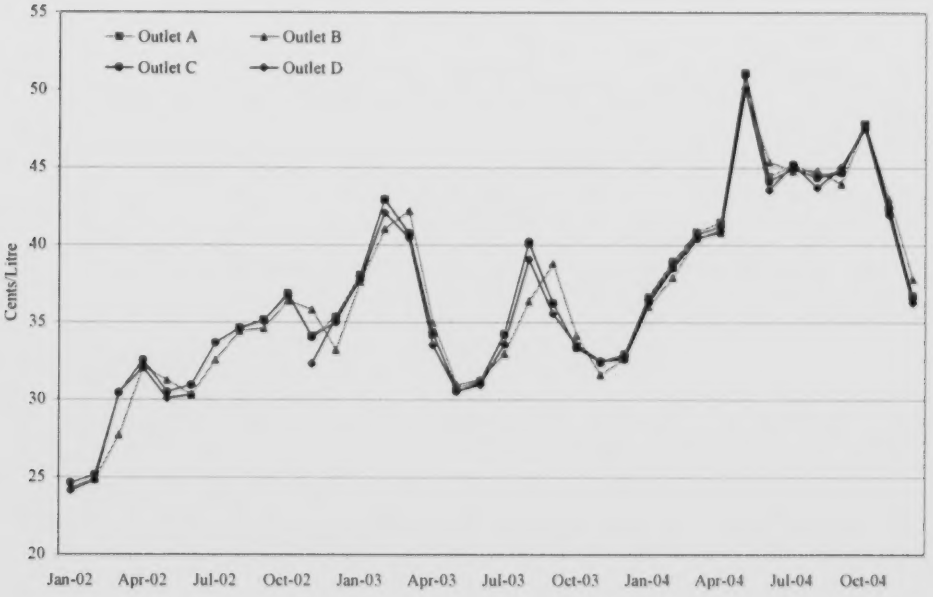


Figure 5 – Average Monthly Wholesale Prices for Mid-grade Gasoline

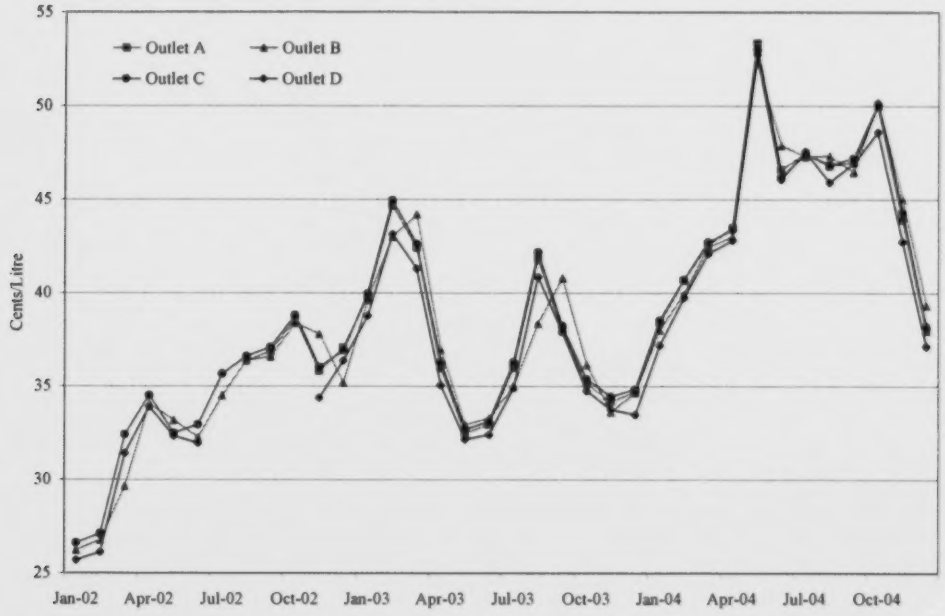


Figure 6 – Average Monthly Wholesale Prices for Premium Gasoline

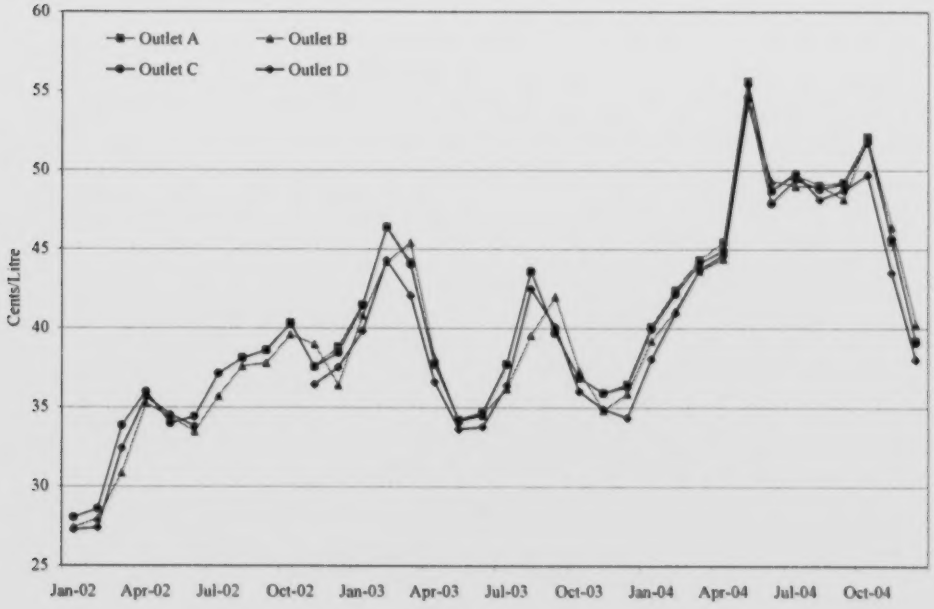


Figure 7– Average Monthly Profit Margin for Regular Gasoline

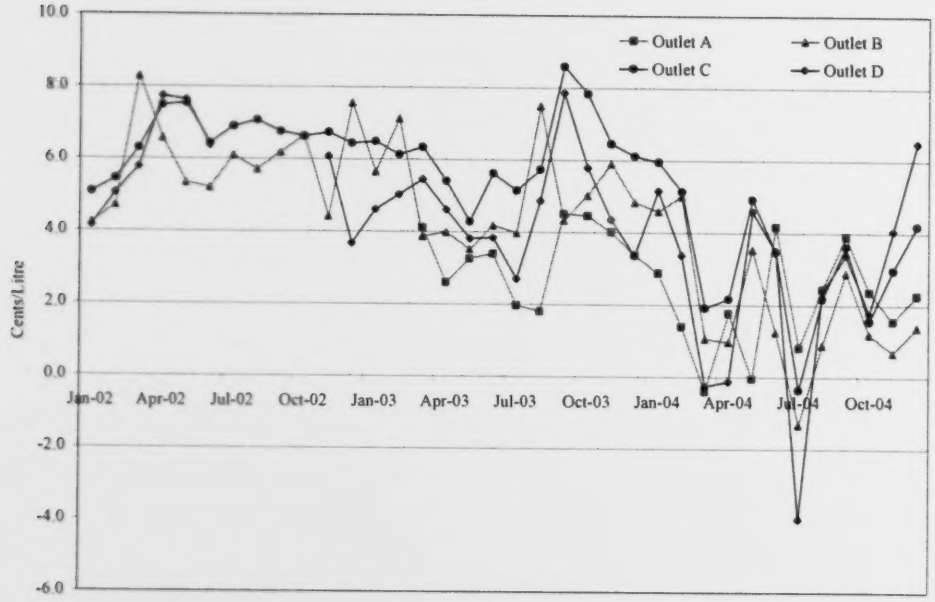


Figure 8 – Average Monthly Profit Margin for Mid-Grade Gasoline

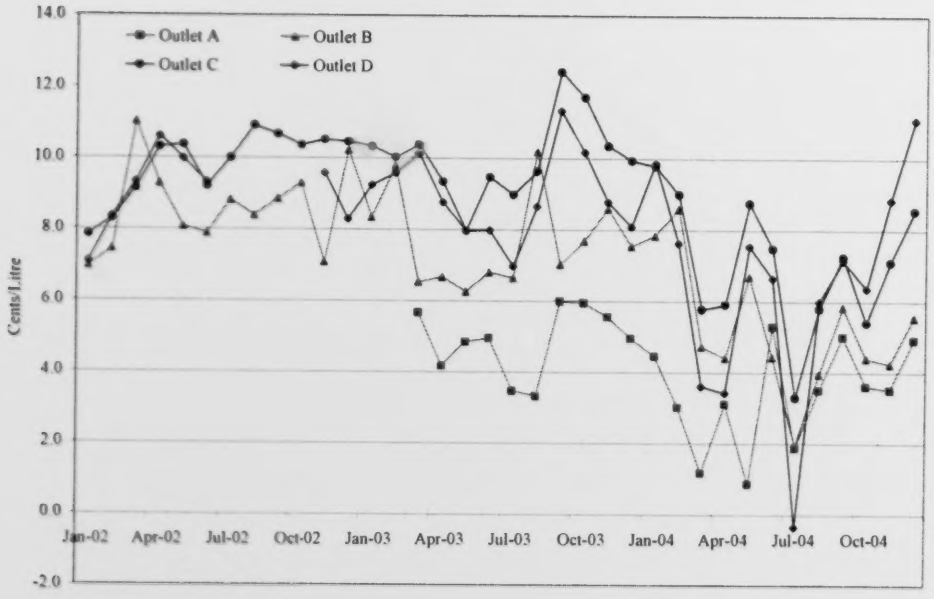
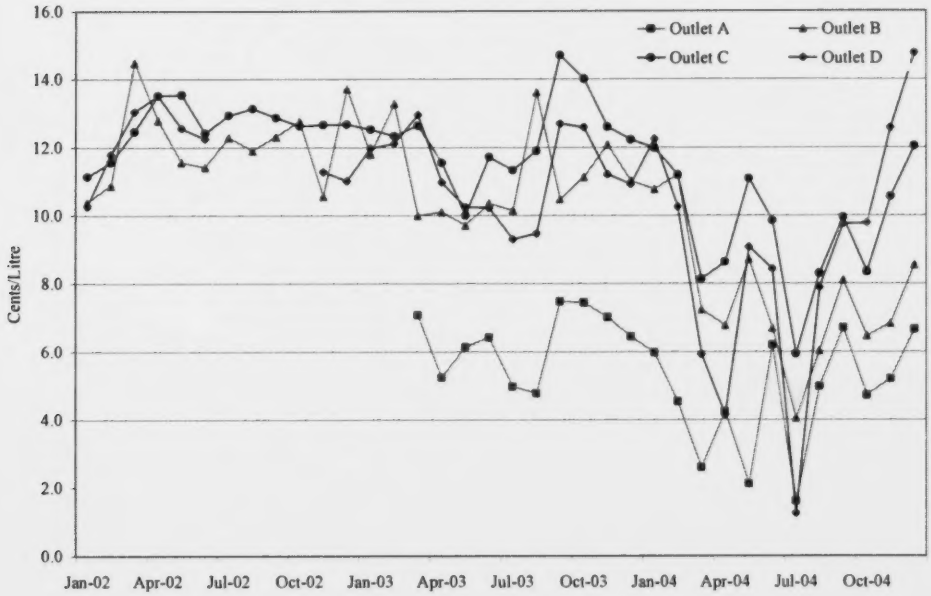


Figure 9 – Average Monthly Profit Margin for Premium Gasoline



5.5 *Econometric Analysis*

While the above analyses are interesting, they may simply reflect the effects of other unobserved factors that also impact movements in retail and wholesale prices over time. In order to understand whether vertically-integrated firms and independents behave similarly, we propose the following straightforward econometric exercises. Specifically, we estimate the: (1) the impact of changes in wholesale prices on retail prices on an individual station basis; and (2) the impact of changes in crude oil prices on wholesale prices on an individual station basis. Similar estimates across stations would imply that vertically-integrated and smaller firms react similarly to crude oil price shocks and thus add greater insight on the profit maximizing behavior of different types of firms.

The econometric specification we employ is quite simple. The dependent variable is the retail price of a specific grade of gasoline. The key covariates are the corresponding current average monthly wholesale price and the previous month's average monthly wholesale price for the particular grade of gasoline, purchased by the station. We also control for time shocks by using month specific fixed effects. Of course, the estimation methodology is Ordinary Least Squares (OLS).[4] Further, two different types of

[4] Coefficient estimates are Newey-West corrected for second order autocorrelation.

specifications are employed in order to evaluate the sensitivity of our results; a levels as well as a log-log model.[5]

Table 12 consists of estimates of the impact of current and lagged wholesale prices on current retail prices for regular grade gasoline.[6] The regressions with pooled outlet A/outlet B data consists of a station fixed effect to distinguish between the two.[7] The first relevant result is the similarity in coefficient estimates across all columns. The levels model from column (1) implies that controlling for other factors, a 1 cent/litre increase in wholesale prices is significantly correlated with a 0.87 cent/litre increase in outlet A/outlet B retail prices. The coefficient estimate from the corresponding levels specification using outlets C and D data is remarkably similar; specifically it implies that a 1 cent/litre increase in wholesale prices is significantly correlated with a 0.87 (0.807) cent/litre increase in retail prices charged by outlet C (outlet D). Corresponding estimates from log-log models are also similar. While using outlet A/outlet B data implies that a 1% increase is wholesale prices is associated with a 0.822% increase in retail prices, outlet C (outlet D) data suggests that a 1% increase in wholesale prices is correlated with a 0.79% (0.73%) increase in its retail prices. Further, the R^2 is very high across all specifications, implying that the variation in retail prices at the station level are almost exclusively explained by movements in wholesale prices.

Tables 13 and 14 contain similar estimates of the impact of mid-grade and premium wholesale prices on mid-grade and premium retail. Again, it can be seen that there is virtually no difference in coefficient estimates of changes in wholesale prices on corresponding movements in retail prices. Empirical estimates from outlet A/outlet B, outlet C, and outlet D data yield very similar results. As in Table 12, the R^2 across empirical specifications in Tables 13 and 14 is very high.

What are the implications of these findings? Basically, changes in wholesale prices predominantly explain variation in retail prices charged by all firms in the sample. Further, all these firms respond quite similarly to changes in wholesale prices.

Tables 15, 16, and 17 contain similar estimates of the impact of crude oil price shocks on regular, mid-grade and premium wholesale prices, respectively. Mirroring previous findings, changes in wholesale prices to crude oil price shocks are extremely similar across stations, irrespective of whether we employ log-log or levels models. One difference is that sum of coefficient estimates of crude oil prices is slightly less than one, as opposed to being equal to or slightly greater than one as found by most other studies. These results are probably due to the aggregated nature of data used by other studies.

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[5] In a levels model, a coefficient estimate is interpreted as the change in "y" associated with a unit change in "x" holding everything else constant. On the other hand, in a log-log model a coefficient estimate is interpreted as the % change in "y" associated with a 1% change in "x" holding everything else constant.

[6] Standard errors are in parentheses. *, **, *** refers to statistical significance at the 1%, 5%, and 10% levels of significance.

[7] We pooled the Outlet B and Outlet A data together, as the Outlet A data by themselves consist of only 16 observations, which is too small to conduct any credible regression analyses.

These results yield some rather firm and credible evidence against the existence of "raising the rivals costs" and instead demonstrate that wholesale prices experienced by vertically-integrated firms and smaller independents follow similar patterns.

Table 12 - Regular Grade Gasoline
(Dependent Variable – Retail Price of Regular Grade Gasoline)

Variable	(1) Outlet A/ Outlet B		(2) Outlet C		(3) Outlet D	
	Levels	Log-Log	Levels	Log-Log	Levels	Log-Log
Wholesale Price	**0.874*** **	**0.822*** **	**0.889*** **	**0.794*** **	**0.807*** **	**0.732*** **
	(0.051)	(0.044)	(0.076)	(0.070)	(0.082)	(0.075)
Wholesale Price (-1)	-0.103	**-0.119***	**-0.131** **	**-0.114** **	-0.006	-0.013
	(0.069)	(0.060)	(0.055)	(0.053)	(0.082)	(0.077)
Station	**1.075** **	**0.028** **	-	-		
	(0.488)	(0.012)				
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.912	0.915	0.916	0.923	0.899	0.903

Table 13 - Mid Grade Gasoline
(Dependent Variable – Retail Price of Mid Grade Gasoline

Variable	(1) Outlet A/ Outlet B		(2) Outlet C		(3) Outlet D	
	Levels	Log-Log	Levels	Log-Log	Levels	Log-Log
Wholesale Price	**0.870*** **	**0.781*** **	**0.889*** **	**0.739*** **	**0.810*** **	**0.684*** **
	(0.055)	(0.041)	(0.080)	(0.067)	(0.075)	(0.065)
Wholesale Price (-1)	-0.073	-0.086	-0.094	-0.073	0.003	-0.006
	(0.065)	(0.053)	(0.062)	(0.055)	(0.084)	(0.073)
Station	**2.640*** **	**0.059*** **	-	-	-	-
	(0.409)	(0.009)				
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.932	0.933	0.917	0.926	0.908	0.917

Table 14 - Premium Grade Gasoline

(Dependent Variable – Retail Price of Premium Grade Gasoline)

Variable	(1) Outlet A/ Outlet B		(2) Outlet C		(3) Outlet D	
	Levels	Log-Log	Levels	Log-Log	Levels	Log-Log
Wholesale Price	**0.831***** (0.047)	**0.717***** (0.036)	**0.882***** (0.077)	**0.705***** (0.062)	**0.776***** (0.08)	**0.633***** (0.069)
Wholesale Price (-1)	-0.089 (0.061)	**-0.097*** (0.050)	-0.093 (0.057)	-0.078 (0.048)	0.009 (0.099)	-0.010 (0.085)
Station	**4.138***** (0.48)	**0.086***** (0.01)	-	-	-	-
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.918	0.918	0.929	0.935	0.885	0.891

Table 15 - Regular Wholesale Gasoline

(Dependant Variable - Wholesale Price of Regular Gasoline)

Variable	(1) Outlet A/ Outlet B		(2) Outlet C		(3) Outlet D	
	Levels	Log-Log	Levels	Log-Log	Levels	Log-Log
Price of Crude Oil	**0.726***** (0.096)	**0.437***** (0.131)	**0.713***** (0.196)	**0.576***** (0.168)	**0.909***** (0.212)	**0.766***** (0.173)
Price of Crude Oil (-1)	-0.033 (0.057)	**0.245**** (0.122)	-0.031 (0.193)	0.075 (0.157)	-0.199 (0.214)	-0.079 (0.174)
Station	0.000 (0.994)	0.009 (0.025)	-	-	-	-
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.768	0.806	0.765	0.800	0.802	0.834

Table 16 - Mid-Grade Wholesale Gasoline
(Dependant Variable -Wholesale Price of Mid-Grade Gasoline)

Variable	(1) Outlet A/ Outlet B		(2) Outlet C		(3) Outlet D	
	Levels	Log-Log	Levels	Log-Log	Levels	Log-Log
Price of Crude Oil	**0.750*** ** (0.095)	**0.456*** ** (0.126)	**0.747*** ** (0.196)	**0.572*** ** (0.159)	**0.933*** ** (0.221)	**0.737*** ** (0.172)
Price of Crude Oil (-1)	-0.040 (0.056)	**0.204*** (0.121)	-0.058 (0.197)	0.051 (0.152)	-0.224 (0.223)	-0.079 (0.173)
Station	0.262 (1.028)	0.015 (0.024)	-	-	-	-
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.768	0.803	0.772	0.805	0.783	0.816

Table 17 - Premium Wholesale Gasoline
(Dependant Variable -Wholesale Price of Premium Gasoline)

Variable	(1) Outlet A/ Outlet B		(2) Outlet C		(3) Outlet D	
	Levels	Log-Log	Levels	Log-Log	Levels	Log-Log
Price of Crude Oil	**0.779*** ** (0.093)	**0.479*** ** (0.124)	**0.786*** ** (0.200)	**0.578*** ** (0.155)	**0.957*** ** (0.231)	**0.713*** ** (0.173)
Price of Crude Oil (-1)	-0.053 (0.056)	0.170 (0.121)	-0.092 (0.206)	0.026 (0.153)	-0.246 (0.233)	-0.079 (0.173)
Station	-0.223 (1.056)	0.002 (0.024)	-	-	-	-
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.774	0.807	0.772	0.803	0.765	0.798

6. Profitability Analysis

6.1 *Caveats*

6.1.1 Information Used

Our analysis is based on information provided by the responding petroleum retailers and their dealer operators. Participating retailers were sent an information request setting out the specific requirements, a copy of which is included as Appendix A. We employ comparable profitability data for 2002, 2003, and 2004 for outlets A and B (independent retailers); and outlets C and E (vertically-integrated firms).

6.1.2 Caution on Incomplete Information & Impact of Cost of Petroleum Purchases on Margins

Only the owner of outlet C has responded with complete information for its selected retail outlet comprising its financial information for outlet C and that of the dealer operator. Outlets E, A, and B have responded with information concerning revenues and expenses recorded by them at the corporate level, but we do not have complete information from them with respect to revenues and costs earned/incurred by their dealer operators. For this reason our analysis at this time is incomplete and any observations or conclusions should be treated with caution.

Further, the level of information provided to us does not specifically set out petroleum input costs separately. This information would be useful in identifying cost differences related to the product cost of petroleum sales that may exist between outlets C and E as integrated oil companies that "sell" to their retail outlets at an internal transfer price and outlets A and B as wholesaler purchasers from one of the integrated firms studied.

Outlet C records the cost of petroleum delivered to its retail sites at an internal transfer price determined by it. We understand from discussions with representatives of outlet C that this transfer price is determined with reference to wholesale prices charged to its large volume customers. We do not know the extent to which the application of this transfer price policy approximates arms length prices or the impact that such a policy may have on profits reported by the outlet. We believe that outlet E's internal transfer price is determined similarly, but we have not been able to confirm this.

However, the analyses in the previous section, suggests the internal transfer price to be quite reliable. Specifically, recall that outlet C's wholesale price is remarkably similar to corresponding wholesale prices experienced by outlets A and B.

6.1.3 Organization of Operations

Each of the outlets analyzed have similar organization structures with all of them controlling the real estate and petroleum inventories with an independent dealer being the site operator. Therefore, in order to obtain a complete picture of the economic unit that comprises each retail outlet, it is necessary to combine the financial results of each of the component entities. Based on our conversations with industry representatives, it is our understanding that in each case it is the parent firm (whether an independent or vertically integrated firm) that establishes pump prices with the site operator being compensated for each litre sold.

6.2 *Sample Outlets*

The retail outlets that we analyzed were selected by the participants as being representative of their retail operations in the Greater Toronto Area and adjoining areas. It is not within the scope of our engagement to undertake any procedures or analysis to determine the extent to which the selected outlets are representative and we can offer no assurance of this in this report.

6.2.1 Outlet A (independent retailer)

The site has 4 fuel dispensing pumps and 8 fuelling stations. The site sells three grades of gasoline: regular, mid-grade and premium and also offers ancillary services and other operations.

6.2.2 Outlet B (independent retailer)

The site has 4 fuel dispensing pumps and 8 fuelling stations. The site sells three grades of gasoline: regular, mid-grade and premium. This site offers ancillary services and other operations.

6.2.3 Outlet C (vertically-integrated firm)

The site has 4 fuel dispensing pumps each offering three grades of fuel from both sides of the pump, with a total of 8 fuelling stations. This site offers ancillary services.

6.2.4 Outlet E (vertically-integrated firm)

This outlet is also owned by a vertically-integrated firm. The site has 6 fuel dispensing pumps. This site offers ancillary services.

6.3 *Analysis*

6.3.1 Organization of Profitability Analysis

Evaluating the profitability of an individual outlet is not straightforward, as it requires assumptions on the relevant product market and the nature of costs, especially given the

available data. Specifically, focusing on the individual profitability of outlets A and B implies an exclusive retail gasoline product market.

However, outlets A and B could very well be merely "loss-leaders" for co-located retail stores with which each is affiliated, intended at attracting consumers, in which case true profitability is probably better measured by taking into account some measure of sales and costs at the co-located retail stores.

But we are handicapped by an obvious lack of data in this regard. As an alternative we have performed a three-tiered analysis. In the first case we will analyze accounting profits by simply evaluating all revenues and costs accruing from gasoline as well as non-gasoline sales for each individual outlet. However, it is important to acknowledge that only outlet C figures are reliable in this regard as they include not only the revenues and costs of the vertically-integrated firm but also of the outlet operator. On the other hand, we do not have data on operator specific revenues and costs with respect to outlets E, A, or B.

In the second case, we evaluate trends in profits by omitting promotional costs for outlets A and B. By doing so, we are implicitly acknowledging that such costs should be taken into account when evaluating the overall profitability of outlets A and B and their co-located retail stores as the product market consists of all goods offered by these firms and are not relevant when exclusively focusing on gasoline.

Finally, the third level of analysis is concerned with the concept of avoidable costs but not from the *perspective of conducting an avoidable costs test*. Costs associated with owning and operating a retail petroleum outlet can be classified as either unavoidable or avoidable. Unavoidable costs are sunk in nature and include those costs to which the operators of the outlet are committed regardless of future actions. As noted previously, avoidable costs are fixed and variable costs that can be foregone by ceasing operation of the outlet.[8] Thus, avoidable costs include those costs that vary with sales levels or are independent of the sales level.

Distinguishing avoidable from unavoidable costs is important as an important aspect of analyzing differences in profitability of retail petroleum outlets is how the nature of costs can impact profitability. For example, labour costs are essentially an avoidable cost, specifically fixed in nature. If an outlet opens it needs one person to control pump operation and to act as cashier. If the outlet does not open it does not incur this expense. However, due to the self serve nature of the operation the amount of labour required is independent of the level of sales. Similarly other costs are avoidable such as electricity used for lighting, heat for kiosks and stores, landscaping and snow clearing services. Outlets with high petroleum sales volumes or that sell merchandize or other services are able to make more efficient use of resources that are represented by avoidable costs than those with lower volumes or that do not have sources of ancillary revenue.

[8] This definition is consistent with the one employed by the Competition Tribunal (http://www.ct-tc.gc.ca/CMFiles/CT-2001-002_0145a_40QXN-4132004-736.pdf).

Maximizing revenues is another manner in which outlets with multiple product offerings (i.e. petroleum products, merchandize or car wash) or higher levels of product sales can increase returns on unavoidable or sunk costs. Unavoidable costs include such costs as the cost of owing or leasing the real estate on which the outlet is situated, related structures and equipment. These costs include acquisition or rent costs as well as costs related to such assets such as insurance and property taxes.

Costs that are variable in nature and relate directly to sales volumes such as the cost of petroleum products sold, merchandize costs and water, power and repair and maintenance costs related to car wash operations would not by their nature differentiate one operation from another. Naturally some operations may more efficiently control those costs or have lower costs of supply, which would be a source of variance of profitability. In order to understand the impact of such costs on profitability, we reassess the profits from each individual outlet by omitting labour expenses.

6.3.2 Profitability Calculated from Outlet Specific Revenues and Costs

We begin our analysis by calculating profits as net income before income taxes as reported in the financial information provided by outlets C, E, A and B. In other words, the profitability of the outlet is defined in terms of revenue that is generated from the outlet and is based on gasoline sales and sales from ancillary services.[9] Hence, we analyze the profitability of outlets A and B on a stand-alone basis and implicitly assume gasoline as the relevant product market.

Consequently, there are some key differences in contrast to the analyses in the earlier sections of this report. Recall that profits were defined exclusively in terms of gasoline sales with costs being captured by wholesale prices. We are now able to add profits from ancillary services as well as factor in outlet specific operating costs in our attempt to evaluate overall profitability.

In calculating profits from gasoline sales, revenue is obviously retail prices times quantity sold minus associated costs. Associated costs in this case are specifically cost of sales or wholesale price multiplied by quantity sold, corporate and overhead expenses, labour expenses, administrative expenses, and general site expenses. Profits from ancillary services are simply revenue minus associated costs.

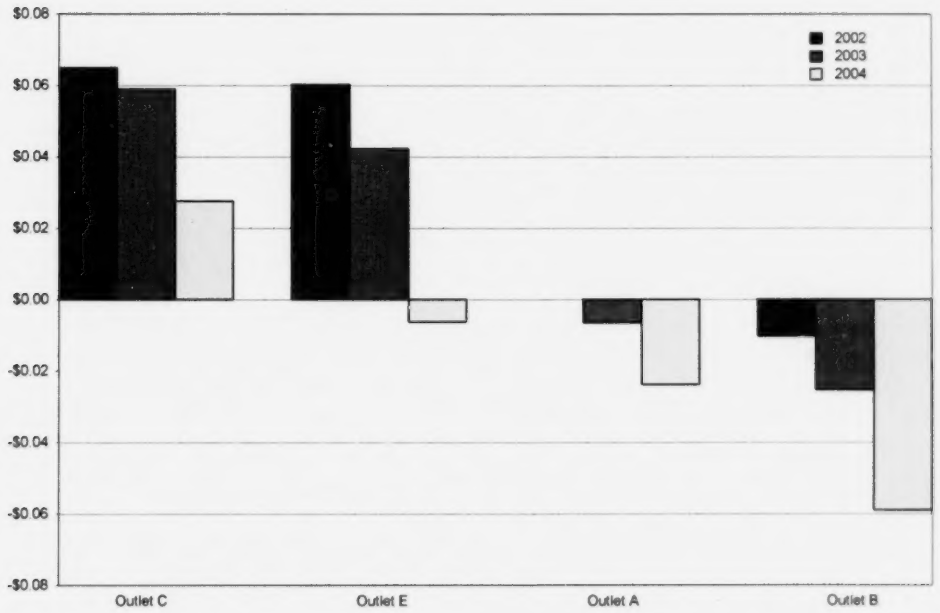
In order to preserve confidentiality, our figures are reported in terms of profitability per litre.[10] The profitability of the outlets analyzed for the years 2002 to 2004 is summarized in Figure 10 below. Outlet C is considerably more profitable than the other outlets. While outlet E did make profits in 2002 and 2003, it made losses in 2004. On the other hand, outlets B and A have always incurred losses. One general trend consistent across all outlets is the significant decrease in overall profitability from 2002 to 2004. Outlet C's

[9] That is, exclusive of the operators of the co-located retail store

[10] Profits are net income before income taxes as reported in the financial information provided by Outlet C, Outlet E, Outlet A and Outlet B.

profit per litre of throughput was considerably higher than either outlet A or outlet B, at $0.07 per litre in 2002, $0.06 per litre in 2003 and $0.03 per litre in 2004. Corresponding figures for outlet E are not that different – with the exception of the $0.1 per litre loss in 2004.

Figure 10 – Total Profit per Litre



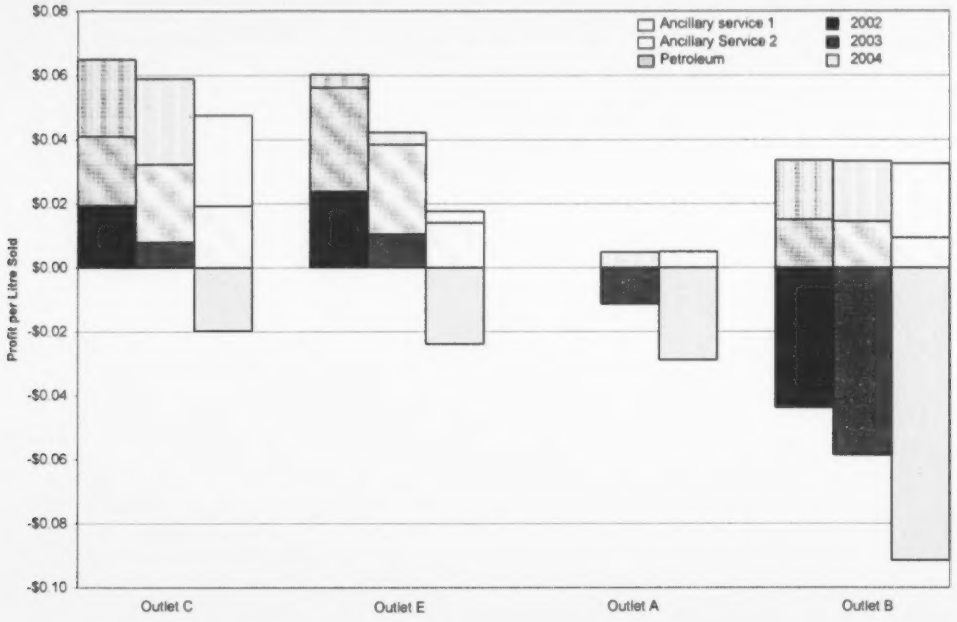
Unsurprisingly, ancillary revenues are also an important component of profitability. Figure 11 sets out the contribution to profits segregated between "ancillary service-1" and "ancillary service-2" on a per litre basis.[11] Profit by sales type has been derived by allocating costs that are not directly related to ancillary services, such as corporate expenses, overhead, and administration costs and site costs to petroleum sales. This allocation is consistent with the nature of the operations where petroleum sales are the primary business line.

The key finding that emerges from Figure 11 is the importance of ancillary revenue especially for outlets C and E. Specifically, outlet C made an average annual profit of $0.03 per litre on $0.08 per litre of ancillary service-2 revenue, and $0.02 per litre on $0.03 per litre of ancillary service-1 revenues over the years 2002 to 2004. Although outlet C made a total profit of $0.03 per litre in 2004, the results consisted of ancillary service-1 profits of $0.02 per litre, ancillary service-2 profits of $0.03 per litre and a loss

[11] In order to preserve confidentiality we cannot reveal what services are exactly covered in ancillary service-1 and 2.

on petroleum of $0.02 per litre. Clearly, ancillary revenues are an important component of profitability.

Figure 11 – Profit per Litre by Sales Type in Dollars



The other important detail is that the above profit figures are quite different than those described in the previous section. This is because those figures were derived by simply subtracting wholesale prices from retail prices and then multiplying it by volumes.[12] On the other hand, the numbers in Figure 11 have been calculated by allocating other costs (such as overhead) that are associated with gasoline sales as well as non gasoline revenues and costs. Once that is accomplished, the perception on the relative profitability of stations is changed quite considerably. Outlet E actually made a loss in 2004 while outlets A and B *incurred losses from gasoline sales in each year*. This is in contrast to the conclusions of successive annual profits made by each outlet, when exclusively relying on gasoline revenues and expenses. The policy implication of this finding is considerable. Specifically, rather skewed perceptions on station profitability can emerge by relying on figures that simply deduct wholesale prices from corresponding retail prices or alternatively, from the belief that gasoline prices are "extraordinarily high".

[12] Of course, the retail profit margins from the economic analyses are not strictly comparable to these profitability figures because of differences in time periods as well as outlets.

6.3.3 Profitability by Omitting Coupons and Discounts

We now revaluate our results by omitting coupons, discounts, and other promotional expenses from our analyses. Figure 12 consists of profits per litre while Figure 13 separates the numbers again in per litre amounts.

Figure 12 – Total Profit per Litre Before Promotion/Discount Expense

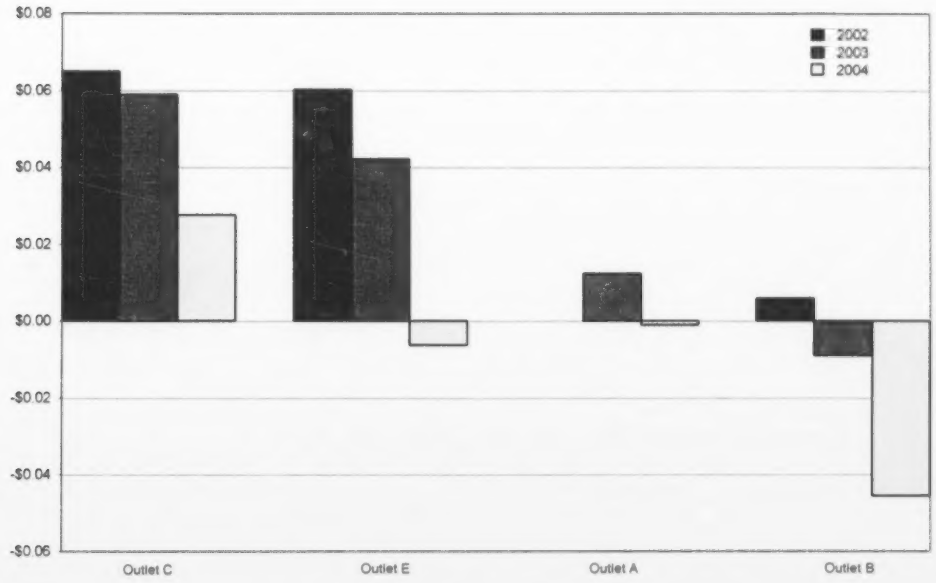
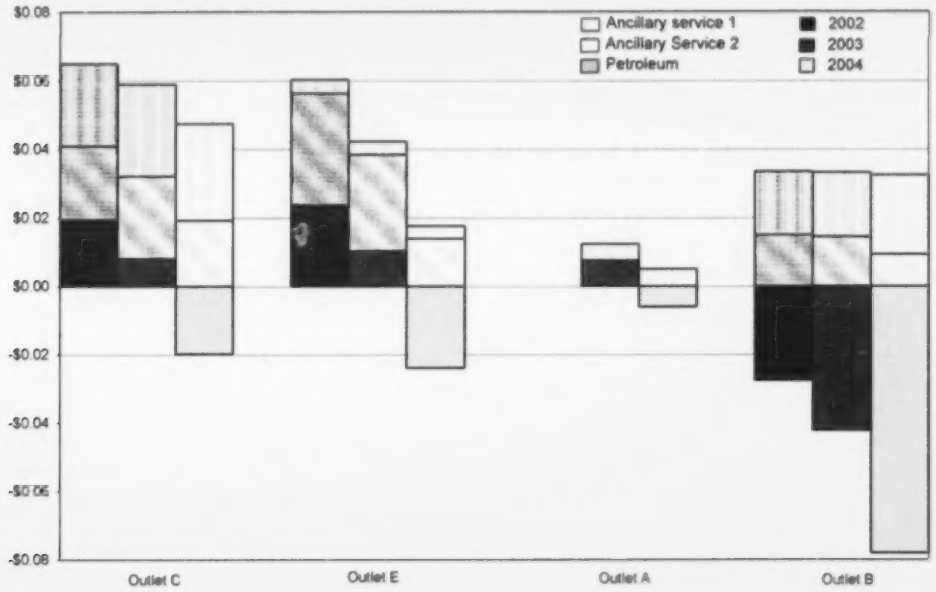


Figure 13 – Profit per Litre by Sales Type in Dollars Before Promotion/Discount Expense



Our previous findings change slightly for outlet A, as Figure 12 indicates that outlet A made a profit in 2003 and a loss in 2004. On the other hand, while outlet B earned a profit in 2002, it continued to make losses in 2003 as well as 2004.

Given the fact that we previously added promotional and coupon expenses to costs of gasoline sales it is unsurprising that Figures 12 and 13 demonstrate enhanced profits specifically with respect to this component of overall profitability. However, only outlet A experiences profits, while outlet B still suffers losses.

6.3.4 Profitability by Omitting Coupons and Discounts and Labour Expenses

As a further sensitivity analysis, we replicate the above analysis by omitting not only coupons, discounts, and other promotional costs, but also labour expenses from our figures. Figure 14 denotes corresponding profits per litre while Figure 15 gives further detail according to type of sale in per litre amounts.

Figure 14 – Total Profit per Litre Before Promotion/Discount & Labour Expenses

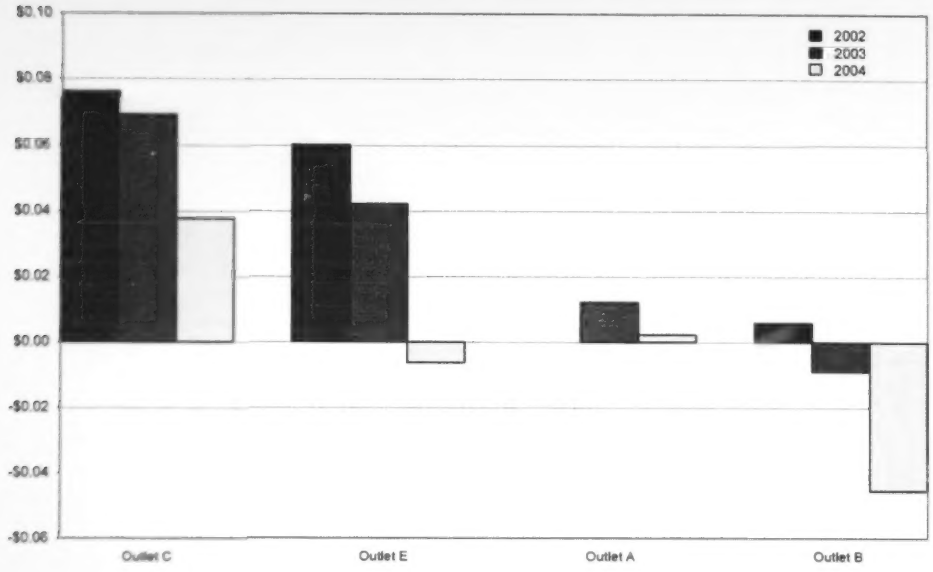
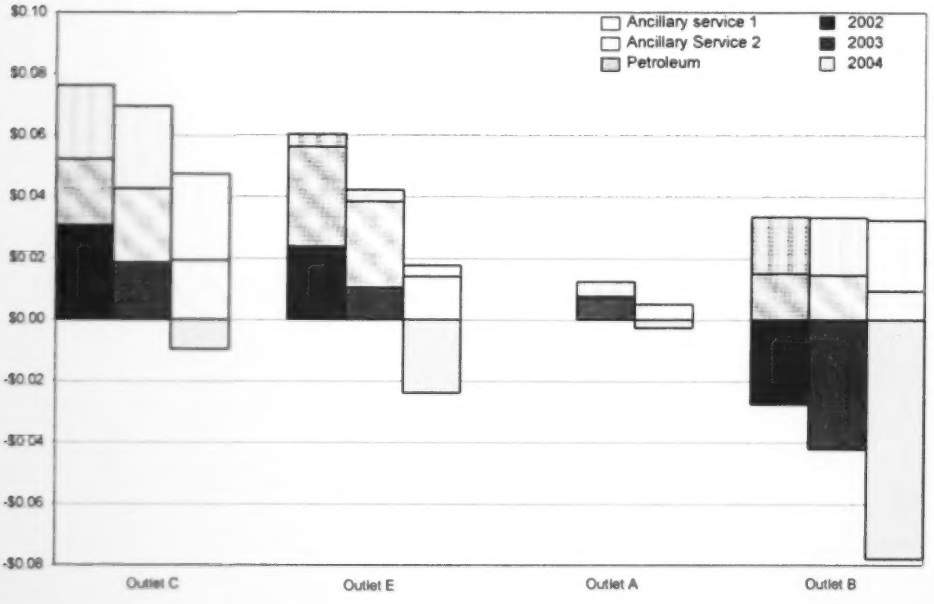


Figure 15 – Profit per Litre by Sales Type in Dollars Before Promotion/Discount & Labour Expenses



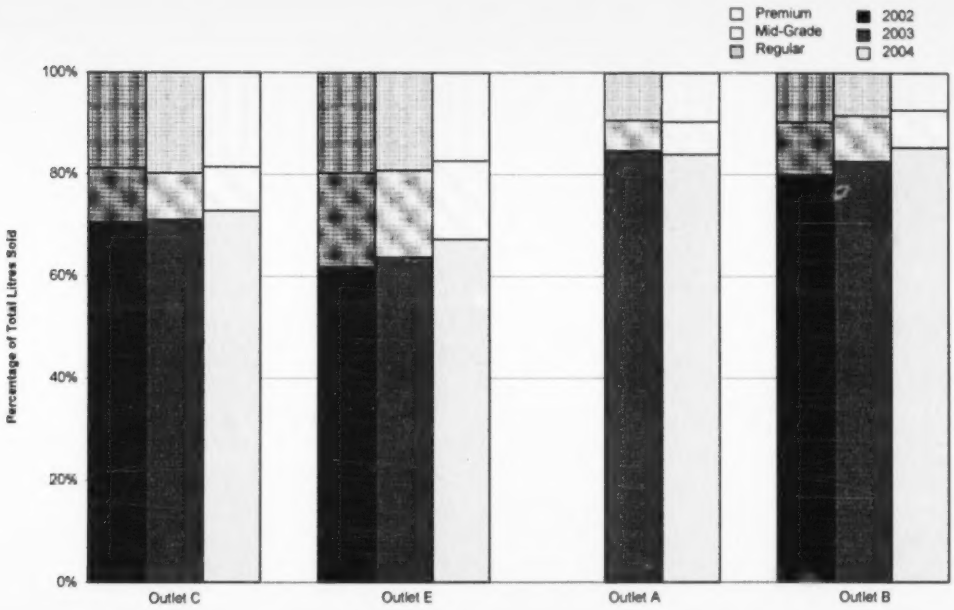
The main implications are simple to decipher. Figure 14 shows that outlet C as well as outlet A consistently made profits while outlet B only succeeded in earning profits in 2002 and outlet E incurred a loss in 2004. Figure 15 is quite similar to corresponding figures from 6.3.3. However, one must be very careful in drawing strong inferences given the incomplete nature of the data. Specifically, we do not possess complete information on labour costs incurred by the operators for outlets E, A, and, B.

6.3.5 Petroleum Sales Volume and Grade Mix

Since the sale of gasoline is obviously the key business, it is important to evaluate the determinants of trends in gasoline sales volumes. Gasoline sales volume is also a basis of comparison for outlet locations and their ability to generate customer traffic for sales of ancillary products.

Figure 16 compares the percentage of the sales volume of the three grades of gasoline to the total volume sold for the years 2002, 2003 and 2004. In this respect, Figure 16 clearly demonstrates the significant success of vertically-integrated firms (outlet C and outlet E) with respect to premium blends. Specifically, outlets C and E had the highest percentage of higher-grade gasoline volume sold with a mix of 30% and 36% premium grades (mid-grade and premium), respectively, over the years 2002 to 2004, compared to only 15% premium grades for outlet A and 20% for outlet B.

Figure 16 – Petroleum Sales Volume Grade Mix Percentage

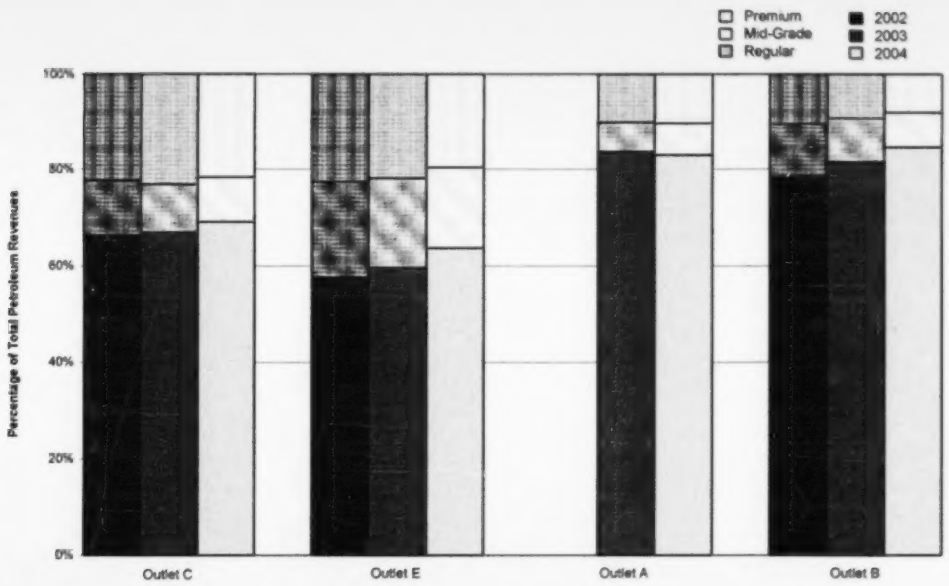


6.3.6 Petroleum Sales Revenue and Revenue Grade Mix

Of course, gasoline revenue is a function of sales volume as well as the price per litre of gasoline sold, net of taxes.

Hence, Figure 17 compares the gasoline revenue mix as a percentage of total gasoline revenues for the three outlets. As can be seen in Figure 17, premium grades contribute significantly more to the outlet C outlet's revenues at an average of 32% than they do for either outlet A or outlet B at averages of 16% and 18% respectively. Outlet E's proportion of revenue sales from premium grades is also high at 39%.

Figure 17 – Petroleum Revenues Grade Mix Percentage

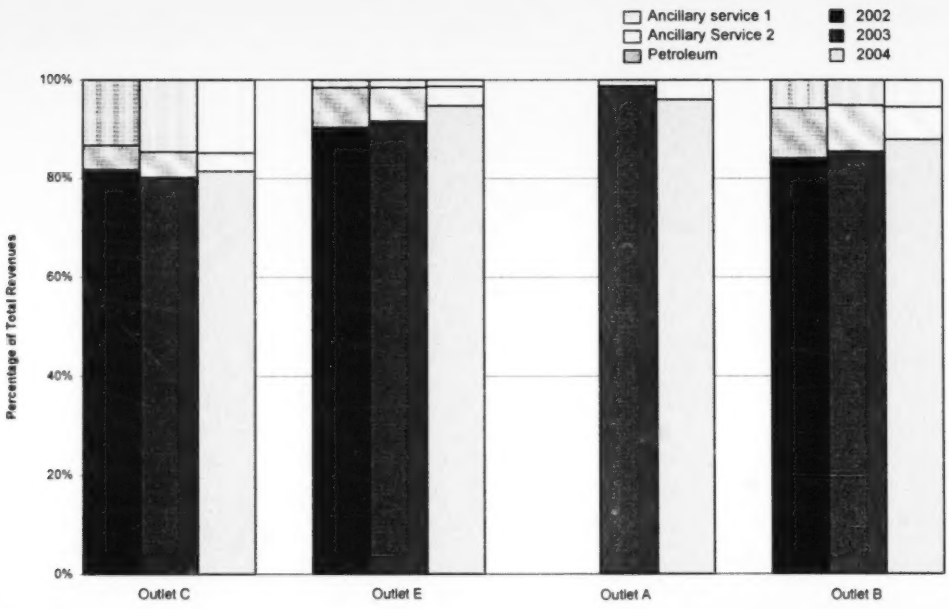


6.3.7 Revenues by Sales Type

Figure 18 compares revenues from petroleum sales and ancillary services. Ancillary revenues (i.e. revenues from sources other than gasoline sales) are important as they indicate the extent to which an outlet maximizes profits by leveraging off of unavoidable costs, which are required to generate gasoline revenues. While outlets C, E, and B each have car wash operations, outlet A does not. Again, it is important to note that we do not possess complete revenue/cost figures for site operators with respect to outlets E, A, or B.

The numbers imply that outlet C had the highest percentage of ancillary revenues with a mix of 80% gasoline revenues, 5% ancillary service-1 revenues and 15% ancillary service-2 revenues, compared to: outlet E at 92%, 6%, 1%; outlet B at 85%, 10%, 5%; and outlet A at 97%, 0%, 3%.

Figure 18 – Revenues by Sales Type Percentage



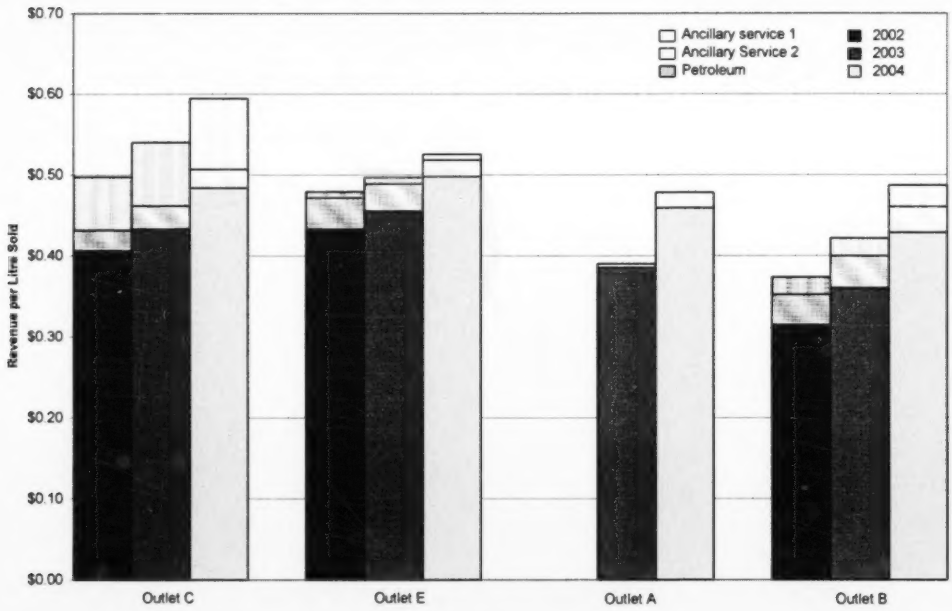
In order to compare the different outlets' ability to derive ancillary revenues from gasoline sales, the various types of revenues can be divided by the volume of gasoline sold. Figure 19 compares revenue per litre from the three sales types for each outlet over the years 2002, 2003 and 2004.

Outlet C derived the most ancillary revenues per litre of gasoline sold on average over the years 2002 to 2004 with $0.08 of ancillary service-2 revenue per litre and $0.03 of ancillary service-1 revenue per litre, compared to outlet B with $0.02 of ancillary service-1 revenue per litre and $0.04 of ancillary service-1 revenue per litre and outlet E with $0.01 of ancillary service-2 revenue per litre and $0.04 of ancillary service-1 revenue per litre. Outlet A only derived $0.01 of ancillary revenue per litre, all from ancillary service-2 sales. Consistent across all the outlets is the trend of ancillary revenues per litre remaining fairly constant as gasoline revenue per litre increased for each outlet from 2002 to 2004.

On the other hand, gasoline revenue per litre increased for each outlet from 2002 to 2004. Of particular interest is that outlet C and outlet E had significantly higher revenues per litre (0.50 and 0.48 cents/litre, respectively) than either outlet A or outlet B. This difference in part is explained by the grade sales mix of both outlet C and outlet E; possessing a higher proportion of premium grades with related higher prices. Outlet C enjoyed an increase in gasoline sales from $0.41 per litre in 2002 to $0.48 in 2004, while

outlet E experienced an increase from $0.43 to $0.50 cents/litre over the same time period. In comparison, outlet A experienced an increase from $0.39 per litre in 2003 to $0.46 per litre in 2004 and outlet B saw a rise from $0.31 in 2002 to $0.43 per litre in 2004.

Figure 19 – Revenue per Litre by Sales Type in Dollars



6.3.8 Gross Margin by Sales Type

For the purpose of this report, we have derived gross margins from the financial data provided by firms C, E, A and B for their respective outlets by taking revenue for the various sales types, deducting cost of sales as itemized in the financial data provided, and deducting other expense items which can be identified as being directly attributable to the various sales types. For example, where repairs and maintenance expenses and utility expenses (e.g. water expense related to car wash revenue) were identified in the data to a specific sales type, we allocated the expense item to cost of sales to arrive at gross margin. Gross margin percentages were derived by dividing gross margin by revenues. The expense items not allocated to cost of sales for this analysis were labour costs, corporate and overhead expenses, administrative expenses, general site expenses, interest and depreciation.

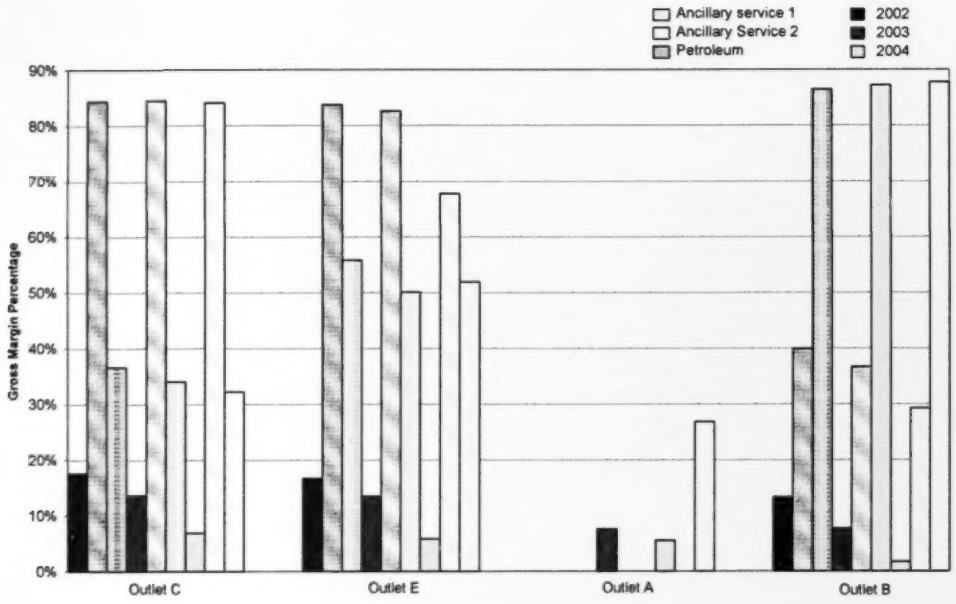
Gross margin is a primary profitability factor as it provides a measure of profit after deducting from revenues costs directly associated with sales made. Figure 20 compares

gross margin percentage by sales type for the three outlets for the calendar years 2002, 2003 and 2004. Outlet C had the highest gasoline gross margin percentages at approximately 18% for 2002, 14% for 2003 and 7% for 2004. With the exception of 2004, figures from outlet E are quite similar. As is evident, outlet A and outlet B outlets had lower gasoline gross margin percentages.

Based on the level of information provided by the participants, one must be cautious in evaluating the impact that petroleum acquisition costs may have on the differences in gross margins reported by outlets C and E, compared to outlets A and B. Outlets A and B purchase the petroleum products that they sell from integrated oil companies. Therefore petroleum costs included in their cost of sales would be at purchase cost. On the other hand, outlets C and E sell petroleum products that they themselves refine. With respect to outlet C, the petroleum supply cost included in the cost of sales is based on an internal transfer price determined by the outlet. We understand from representatives of outlet C that their transfer price is based on wholesale prices. The analyses contained in the previous section generally confirms this, as the internal transfer price reported by outlet C is remarkably similar to corresponding wholesale prices experienced by outlets B and A.

Outlet C derived the highest gross margin percentage from ancillary service-1 operations at an average of 84% over the years 2002 to 2004. Again, outlet E's figures are quite similar, with the exception of 2004. Outlet B had a lower ancillary service-1 gross margin percentage at an average of 35%. Outlet B had the ancillary service-2 gross margin percentage at an average of 87% over the years 2002 to 2004, compared to outlet C's margin of 34% and outlet A's margin of 27%.

Figure 20 – Gross Margin Percentage by Sales Type, Before Labour Costs

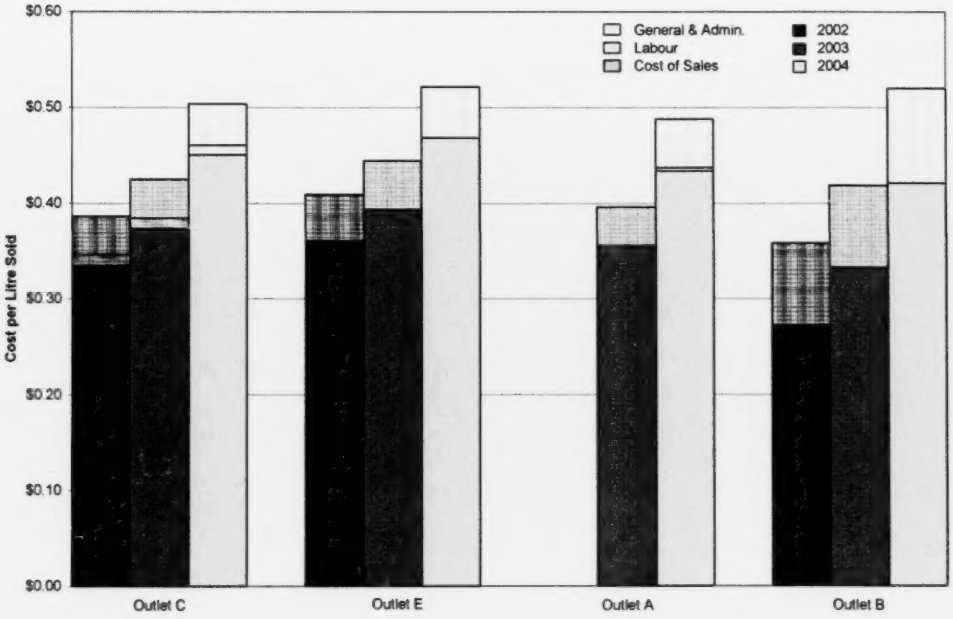


These figures suggest that outlets can earn significant profits from ancillary services. However, it should be noted that sales from ancillary services are probably driven by throughput. The likelihood of maintaining significant profits from the sale of ancillary services with declining gasoline throughput is probably quite remote.

6.3.9 Summary of Costs Attributable to Petroleum Revenue

Figure 21 compares the costs attributable to petroleum revenues on a per litre basis. This analysis indicates that petroleum acquisition costs appear to be approximately equal for outlet C, outlet E, and outlet A and slightly lower for outlet B. Outlet B's general and administrative costs on a per litre basis are significantly higher than either of the other outlets. This is due at least in part to the outlet B outlet's significantly lower petroleum volumes, increasing the average cost per litre. Given its high volumes it is unsurprising that outlet C has the lowest per unit cost across most categories.

Figure 21 – Costs Attributable to Petroleum Revenues per Litre



7. Conclusions

The objective of this research is to address a significant gap in the literature by using empirical analysis to understand significant determinants of individual outlet profitability with respect to retail gasoline. In doing so, we are implicitly assuming that the relevant product market is gasoline. There are also some important caveats to acknowledge. First, caution must be exercised in generalizing the conclusions of this study as our dataset only consists of five stations from the Greater Toronto Area and adjoining areas. Second, our sample of independents consists of retailers whose primary revenues are not from gasoline. Third, our profitability analysis is incomplete as we were unable to obtain all information on expenses and ancillary revenues of site operators.

Nevertheless, the benefits of using economics as well as accounting style profitability analyses are obvious. Both methodologies yield some very complementary findings with respect to the profitability of a retail gasoline outlet. Employing individual data between 2002 and 2004 from five stations (outlets A and B owned by two different independent retailers, and C, D, and E – each owned by a different vertically-integrated firm), we specifically arrive at the following conclusions.

1. Simple graph as well as more sophisticated econometric analysis suggests that movements in both retail and wholesale prices are largely dictated by corresponding fluctuations in crude oil prices. In other words, we find that an increase in wholesale and crude oil prices results in a similar increase in retail and wholesale prices, respectively, for all outlets. These results are striking because they imply that outlets react quite similarly to crude oil price shocks irrespective of whether the firm is vertically-integrated or an independent retailer. Further, they demonstrate the benefits of possessing individual station data, which permits us to conduct the analysis. Specifically, a 1 cent/litre increase in wholesale prices is significantly correlated with a 0.87 and 0.81-.0.89 cent/litre increase in retail prices for regular grade gasoline charged by independents and vertically integrated firms, respectively. On the other hand, a 1 cent/litre increase in crude oil prices is associated with a 0.73 and 0.71-0.91 cent/litre increase in (regular grade) wholesale prices experienced by independents and refiners, respectively.

2. The above and the fact that outlet C's internal transfer prices are almost identical to wholesale prices incurred by outlets B and A cast serious doubt on the possibility of strategic behaviour by vertically-integrated refiners. This result offers contrary evidence against the likelihood of predation by vertically-integrated firms, specifically in the form of higher wholesale prices charged to independents.

3. The economic analysis demonstrates the positive profit margins enjoyed by all outlets with respect to gasoline sales, calculated simply as the difference between retail and wholesale prices multiplied by sales volumes. When profits are calculated in this limited and imprecise fashion, trends in it seem to be driven

mainly by throughput as is evident in the differences between outlets B and C (the vertically-integrated firms) in this respect.

4. However, pricing also contributes to profitability. This becomes quite apparent when one takes into the account the relatively small gap in sales volumes but much wider spread between average retail prices charged by outlet C (vertically integrated firm) and outlet A (independent).

5. Due to the limited sample size we are unable to determine the reason why outlet C is able to charge higher prices. Possible factors include consumer preferences due to branding and to the availability of a wide array of ancillary products, and differences in the degree of local competition.

6. In this respect, there seems to be some qualified support for the idea that local competition impacts prices charged by outlets. This is especially relevant when one compares the higher prices charged by outlet C compared to outlet D and the fact that outlet D has to compete with more outlets within a 1 km radius.

7. Although all the stations do make positive margins on gasoline sales (taking into account only wholesale prices), the profitability analysis clearly demonstrates that these figures are erroneous without factoring in station specific costs. Once avoidable and unavoidable costs have been included, both outlets A and B incur losses with respect to gasoline sales. These findings clearly demonstrate the pitfalls of relying on simple differences between retail and wholesale prices in evaluating outlet and ultimately, industry profitability. Further, the results underscore the point that high gasoline prices do not necessarily translate into enhanced and sustainable profits.

8. The losses incurred by A and B may be interpreted as evidence of predation. However, given the similarity in wholesale prices between themselves and vertically-integrated firms, and common patterns in retail prices, this is extremely improbable.

9. From an overall perspective, outlet C is the only profitable outlet on an annual basis. Although, outlet C's prices are higher, its profitability seems to be driven mainly by the fact that its throughput is considerably higher than the other outlets.

10. However, this is of course assuming a strictly retail gasoline product market. In all likelihood, outlet A and outlet B make significant profits from the retail stores the gasoline outlet is co-located with.

11. Unsurprisingly, most gasoline revenues are generated from the sale of regular grade gasoline. But the vertically-integrated firms (outlets C and E) do earn a larger proportion of revenue from the sale of premium grade fuels relative to outlets A and B.

12. All stations make profits from the sale of in-store products as well as car wash services. But relatively, the vertically-integrated firms (outlets C and E) make considerably higher profits on ancillary sales (car wash and convenience store) compared to the independents, both in absolute as well as proportional terms.

13. Hence, is it possible that vertically-integrated firms might be able to sustain low retail prices by relying on sales of ancillary products? First, the price elasticity of demand for gasoline from an individual station is probably quite high, implying that a drop in retail prices will probably result in significantly increased revenue. However, even if retail prices do drop below wholesale prices, it is unlikely that stations can exclusively rely on revenues from ancillary services.

14. We are limited in what we can say about station efficiency given some missing data on ancillary revenues and specific costs incurred by actual site operators.

15. The critical factor driving profitability is *throughput*, which not only impacts *revenue* but also *average total costs* and hence *profitability*. Throughput is obviously related to factors such as population density, local traffic, and the degree of local competition. In this respect, the Bureau should be careful in its investigation of alleged anti-competitive actions by vertically-integrated firms. Losses incurred by specific outlets could be a function of a variety of factors that are simply a result of poor business strategy, circumstances, or choice, rather than a consequence of predation or squeezing.

8. References

Eckert, Andrew, and Douglas S, West (2004) "Retail Gasoline Price Cycles across Spatially Dispersed Gasoline Stations", *Journal of Law and Economics*, 47(1), pp. 245-73.

Eckert, Andrew (2003) "Retail Price Cycles and the Presence of Small Firms", *International Journal of Industrial Organization*, 21(2), pp. 151-70.

Kardasz, Stanley W., and Anindya Sen (2005) "An Empirical Test of Raising the Rivals' Costs", Working Paper, University of Waterloo.

Sen, Anindya (2005) "Does Increasing the Market Share of Smaller Firms Result in Lower Prices?", forthcoming, *Review of Industrial Organization.*

Sen, Anindya (2003) "Higher Prices at the Gas Pump: International Crude Oil Price Fluctuations or Local Market Concentration? An Empirical Investigation", *Energy Economics,* 25(3), pp. 269-88.

9. Appendices

Appendix A. Information Request Sent to Participating Retailers

Competition Bureau
(Confidential once completed)

Information Request

1. What is the corporate name of your company and the trade name or banner(s) under which it conducts business?

2. What is the address and postal code of the gas station?

3. For the past three years, supply the gasoline station's monthly profit and loss operating statements, in electronic format and in sufficient detail to:

i) provide separate financial results for fuel retailing operations, car wash operations, food/merchandise retailing operations or other operations. These operating statements should separately disclose revenues and cost of sales and operating costs to the extent that they can be allocated to specific operations;

ii) disclose details of costs by major category, including labour, repairs and maintenance, utilities, equipment leasing/depreciation, insurance, supervision, overhead including allocations of costs from head office, if any.

iii) provide information on physical volumes of fuel sold;

iv) provide information on hours of labour worked by all wage earners and salaried employees.

4. For the past three years, provide the gasoline station's monthly balance sheets, in electronic format and in sufficient detail to indicate separate information on assets and liabilities associated with fuel retailing operations, car wash operations, food and merchandise retailing operations or other operations.

5. For the past three years, supply the gasoline station's information on:

   i) the size of the site; the number of fuel dispensing pumps and the size of any merchandising outlet or other operations;

   ii) any labour, supervisory or other costs that were in respect of services provided by owners or other financially unrelated parties and the basis of those costs.

6. For the past three years, supply the gasoline station's information on:

   i) whether any fuel or merchandise was purchased for the gasoline station from financially unrelated parties and the cost of those purchases.

   ii) the names of suppliers of wholesale gasoline. Also, please provide a breakdown in terms of the amounts obtained each supplier (in percentages).

   iii) whether this breakdown has remained relatively fixed over the past three years. If not, please give a history of changes that have occurred with respect to wholesale arrangements over the past three years.

   iv) wholesale prices paid by you for each grade of gasoline on a monthly basis for the past three years.

   v) the number of grades of gasoline offered by your station. Further, please confirm whether the station has been offering the same grades over the past three years.

   vi) retail prices charged for each grade of gasoline on a daily basis for the past three years.

   vii) the amount of gasoline sold (in litres) for each grade of gasoline on a monthly basis for the past three years.

   viii) the distribution of profits with regard to each grade of gasoline. For example, after taxes, is the distribution of profits from regular/premium 80%/ 20%?

7. For the past three years, supply the gasoline station's information on

   i) how many other competing stations are in a close vicinity.

   ii) which companies are these stations affiliated with.

   iii) what do you imply by "close vicinity" (define in terms of radii).

iv) whether these stations been in existence for the past three years. If not, please document the entry/exit of new/existing stations over the past three years.

8. Can you articulate your business strategy? For example is your strategy to keep a certain margin between retail prices and wholesale prices? If so, what is the average margin you need to maintain? Has this remained constant over the past three years?

9. How much discretion do you have in setting prices? Do you have complete discretion or do you only set prices that are communicated to you by head office? Or is it somewhere in between? If so, please describe the price setting process in detail.

10. On average, how many times do you change prices within a day?

Send confirm your willing to participate and meet our deadline by calling Dennis Lu at (819) 956- 2907. Responses in electronic format may be submitted on a diskette or CD. Send all written responses by fax at (819) 953-8546 or by mailing them along with any diskette or CD to the address below:

Civil Matters Branch, Competition Bureau
Attention: Dennis Lu
15th Floor
50 Victoria Street,
Gatineau, Québec
K1A 0C9

Anindya Sen
Department of Economics
University of Waterloo
200 University Avenue
Waterloo, Ontario
Canada N2L 3G1
Phone: (519) 888 4567 ext. 2123
Fax: (519) 725 0530
Email: asen@watarts.uwaterloo.ca

EMPLOYMENT

July 2005 to present: Associate Professor of Economics, University of Waterloo

Sept. 2002 to present: Affiliated Research Scientist, Center for Behavioral Research and Program Evaluation, Faculty of Health Sciences, University of Waterloo

Sept. 1999 – June 2005: Assistant Professor of Economics, University of Waterloo

June 1998 - Aug. 1999: Economist, Competition Bureau, Federal Government of Canada

EDUCATION

1998 Ph.D., Economics, University of Toronto.
1992 M.A., Economics, Concordia University
1990 B.A. (Hons.), Economics, University of Delhi

AWARDS

- Distinguished Teacher of the Year Award, 2004; given by the students of the Economics Society.
- Nominee, University Distinguished Teacher of the Year Award, 2004

GRANTS

External

- Co-investigator, "Improving Access to Canadian Smoking Data", Canadian Tobacco Research Initiative, ($1,500,000). 08/04-08/09
- Co-Investigator, "Improving the Population Impact of Telephone Counselling for the Treatment of Smoking", Heart and Stroke Foundation, ($1,209,618) 08/01-06/06.

Internal

- CBRPE Faculty Award ($20,000), 2001-03
- New Faculty Research Award ($5,000), University of Waterloo, 2000

PUBLICATIONS

Work Published in Refereed, Scholarly Journals

Public & Health Economics

1. Sen, Anindya "Do Stricter Penalties or Media Publicity Reduce Alcohol Consumption By Drivers?", *Canadian Public Policy* 31(4), December 2005.

2. Sen, Anindya "Is Health Care a Luxury? New Evidence from OECD data", *International Journal of Health Care Finance and Economics* 5(2), June 2005, pp. 147-164.

3. Sen, Anindya, Jonathan Gruber, and Mark Stabile, "Estimating Price Elasticities When there is Smuggling: The Sensitivity of Smoking to Price in Canada." *Journal of Health Economics* 22(5), September 2003, pp. 821-42

4. Sen, Anindya, "An Empirical Test of the Offset Hypothesis", *Journal of Law and Economics* 44(2), October 2001, pp.481-510.

5. Sen, Anindya, "Do Stricter Penalties Deter Drinking and Driving? An Empirical Investigation of Canadian Impaired Driving Laws", *Canadian Journal of Economics* 34(1), February 2001, pp. 149-164.

6. Sen, Anindya, "Will Stricter Penalties Deter Drunk Driving?", *Policy Options* 20(7) 1999, pp. 54-57.

Industrial Organization

7. Sen, Anindya, "Does Increasing the Market Share of Smaller Firms Result in Lower Prices?", *Review of Industrial Organization*, 26(4), 2005, pp. 371-389.

8. Sen, Anindya, "Higher Prices at the Gas Pump: International Crude Oil Price Fluctuations or Local Market Concentration? An Empirical Investigation.", *Energy Economics,* vol. 25, no. 3, May 2003, pp. 269-88.

9. Sen, Anindya and Ted Mallett, "Does Local Competition Impact Interest Rates Charged on Small Business Loans? Empirical Evidence from Canada", *Review of Industrial Organization*, 19(4), December 2001, pp.435- 450.

10. Sen, Anindya, Ted Mallett, and Ruma Sondhi, "Jury Still Out on Internet Benefits: More Branches Keep Bank's Loan Rates Low", *Canadian Business Economics* 8(3), February 2001, pp.21-29.

Work Published in Conference Proceedings

11. Sen, Anindya, "Traffic Fatalities and Seatbelt Laws", Canadian Transport Research Forum Meetings,

Consulting Reports

"Estimating the Economic Benefits of the Marine Transport Industry in Canada", (with Peter Dungan and LECG LLC), report for Transport Canada (http://www.cmc-ccm.com/acrobat/MIBS-FinalReport.pdf), 2004.

"A Cost Benefit Analysis of the Multi Jurisdictional Disclosure System", (with Poonam Puri and LECG LLC), report for the Ontario Securities Commission (http://www.osc.gov.on.ca/Regulation/Confidence/pic_20030627_cba-disclosure-system.pdf), 2003.

"Estimating the Impact of Mergers among Bread Manufacturers in Canada", report for the Competition Bureau, Industry Canada, 2001.

"Competition and Gasoline Prices in Eastern Canada", report for the Competition Bureau, Industry Canada, 2000.

PRESENTATION OF RESEARCH

At Conferences

Canadian Economics Association Meetings, 2005, 2004, 2003, 2002; Interdisciplinary Conference Sponsored by the National Cancer Institute of Canada, University of Waterloo, 2001; Canadian Law and Economics Association Meeting, 2000, 1999; International Business and Economics Society Meetings, 1999; Canadian Transport Research Forum Meetings, 1999.

Invited Presentations at Universities

2004 University of Guelph, McMaster University.
2001 Ryerson University, York University, University of Toronto, University of Western Ontario.
2000 McMaster University, Faculty of Health Studies, University of Waterloo.

Other

- "Evaluating the Economic Impact of the Marine Transport Industry", presented to Transport Canada, 2004.
- "Inferring the Presence of Market Power from Tax Hikes", presented to the Competition Bureau, Industry Canada, 2003.
- "Estimating the Impact of Mergers among Bread Manufacturers", presented to the Competition Bureau, Industry Canada, 2001.
- "Competition and Gasoline Prices in Eastern Canada", presented to the Competition Bureau, Industry Canada, 2000.
- Expert Testimony on the Causes of Rising Gas Prices, House of Commons Industry Committee, 1999.

TEACHING

Courses Taught

Undergraduate: ECON 361 (Cost Benefit Analysis), ECON 341 (Public Expenditure), ECON 321 (Econometrics), ECON 201 (Microeconomics)

Graduate: Public Finance, Health Economics

SERVICE

Department Level
Director, Seminar Series, 2000-01, 2003-04
Member, Graduate Committee, 1999-2005

Refereeing
Journal of Political Economy, Canadian Journal of Economics, Journal of Health Economics, Journal of Public Economics, Social Science and Medicine, Journal of Policy Analysis and Management, Contemporary Economic Policy, Southern Economic Journal.

Robert H. Boulton, Principal, LECG

55 University Avenue, Suite 1000
Toronto, Ontario, Canada, M5J 2H7
direct: 416.682.7183
main: 416.364.6400
fax: 416.364.6900
email: bboulton@lecg.com

BIO/SUMMARY

Robert H. Boulton has worked or practiced exclusively in the areas of business valuation, damages quantification and corporate finance since 1986. His experience includes venture capital investing with one of the pre-eminent venture capital firms in Canada and being the CFO of a public multi-national computer component manufacturer. Bob has consulted on matters concerning shareholder disputes, minority oppression actions, intellectual property infringement and professional negligence and has extensive experience with Competition Act matters relating to mergers and acquisitions.

EDUCATION

Chartered Business Valuator, 1999
Chartered Accountant, 1979
Bachelor of Commerce, University of Toronto, 1977

PRESENT POSITION

LECG, Principal, 2004 - Present

OTHER POSITIONS HELD

Low Rosen Taylor Soriano, Principal, 2000 - 2004
Cole & Partners, Associate, 1995 - 2000
Boulton & Associates, Principal, 1990 - 1995
Helix Investments Limited, CFO, 1986 - 1990
Ernst & Young, Chartered Accountants, Senior Manager, 1977 - 1986

PROFESSIONAL MEMBERSHIPS & ASSOCIATIONS

Canadian Institute of Chartered Accountants
Canadian Institute of Chartered Business Valuators
Institute of Chartered Accountants of Ontario

PUBLICATIONS

Journal Articles and Seminars

1. 'Valuation Assumptions Must Be Substantiated and Reasonable' (with Prem Lobo), *The Lawyers Weekly*, September 19, 2003.
2. 'Getting In On The Ground Floor' (with Stephen Cole), *CA Magazine – Business Valuation Section*, May 1998.
3. 'Beating the Odds' (with Stephen Cole), *CA Magazine – Business Valuation Section*, June/July 1996.
4. Lecturer at various professional development programs concerning business valuations.
5. Due Diligence Skills & Best Practices Conference, *Federated Press*, April 2004, Toronto.